University
Academic
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Initial copies of specific college bulletins are available, without charge, together with appropriate sets of application forms from:

The Ohio State University
Admissions Office
102 Administration Building
190 North Oval Drive
Columbus, Ohio 43210

The University Academic Policies and Course Offerings bulletin is distributed to admitted applicants and former students concurrently with registration materials. (See below for locations of complete sets of the bulletins available for review by the public.) When requesting application forms through the mail, applicants should specify their previous educational background and proposed program of study.

Newly enrolled students and former students will receive automatically their appropriate college bulletin(s) and the Academic Policies and Course Offerings bulletin concurrently with registration materials. Additional or replacement copies can be purchased from the University Book Store on all campuses.

Within Ohio, complete sets of the series are available for examination in offices and libraries of colleges and universities, and guidance libraries of high schools. Copies are also available for examination in public libraries, U.S. government offices, major State of Ohio government offices in Columbus, Cooperative Extension offices in each of the State's 88 counties, area extension offices, and administrative offices of the University, as well as in many libraries and colleges outside Ohio.
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University Calendar for 1970-71

Summer Quarter 1970

June 23  Quarter and First Term classes begin, 8:00 a.m. (Tues.)
July 3    Legal Holiday—Independence Day celebrated—No classes, offices closed (Fri.)
July 27-28 Final Examinations for First Term courses only (at regular class hours) (Mon. and Tues.)
July 28   First Term ends, 12:00 Midnight (Tues.)
July 29   Second Term classes begin, 8:00 a.m. (Wed.)
August 31 Final Examinations for Second Term courses only (at regular class hours)
September 1 (Mon. and Tues.)
September 1 Last day of regularly scheduled classes (Tues.)
September 2-4 Final Examinations for Quarter courses (Wed.-Fri.)
September 4 Summer Commencement, 9:00 a.m., St. John Arena (Fri.)
September 4 Summer Quarter ends, 12:00 Midnight (Fri.)

Admission and Registration Dates

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Autumn Quarter 1970

September 7    Legal Holiday—Labor Day—Offices closed (Mon.)
September 30   Classes begin, 8:00 a.m. (Wed.)
November 11    Legal Holiday—Veterans Day—Classes as usual, offices open (Wed.)
November 26    Legal Holiday—Thanksgiving—No classes, offices closed (Thurs.)
November 27-28 Student vacation—No classes, offices open (Fri. and Sat.)
December 11    Last day of regularly scheduled classes (Fri.)
December 14-18 Final Examinations (Mon.-Fri.)
December 18    Autumn Commencement, 9:30 a.m., St. John Arena (Fri.)
December 25    Legal Holiday—Christmas—Offices closed (Fri.)

Admission and Registration Dates

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### Winter Quarter 1971

**January 1**  
Legal Holiday—New Year’s Day  
Office closed (Fri.)

**January 5**  
Classes begin, 8:00 a.m. (Tues.)

**February 15**  
Legal Holiday—Washington’s and Lincoln’s Birthdays celebrated—No classes, offices closed (Mon.)

**March 12**  
Last day of regularly scheduled classes (Fri.)

**March 15-19**  
Final Examinations (Mon.-Fri.)

**March 19**  
Winter Commencement, 9:30 a.m., St. John Arena (Fri.)

**March 19**  
Winter Quarter ends, 12:00 Midnight (Fri.)

### Admission and Registration Dates

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**Scheduling**

- Continuing Students (enrolled Autumn Quarter)
  - Scheduling materials released in college offices  
    (Graduate School at Registrar’s Office)—A-K Mon., L-Z Tues.
  - First day to file Schedule Cards
  - Last day to file Schedule Cards

- Returning Students (not enrolled Autumn Quarter)
  - Scheduling materials released
  - First day to file Schedule Cards
  - Last day to request Schedule Cards
  - Last day to file Schedule Cards

- New Students
  - Scheduling materials released
  - First day to file Schedule Cards
  - Last day to file Schedule Cards

**Fees**

- Last day to pay fees
- Last day for withdrawal
- from the University with any refund of fees

### Spring Quarter 1971

**March 30**  
Classes begin, 8:00 a.m. (Tues.)

**May 6**  
Free Day—No undergraduate classes after 10:00 a.m. (including evening classes)  
Office open (Thurs.)

**May 31**  
Legal Holiday—Memorial Day celebrated—No classes, offices closed (Mon.)

**June 4**  
Last day of regularly scheduled classes (Fri.)

**June 7-11**  
Final Examinations (Mon.-Fri.)

**June 11**  
Spring Commencement, 9:00 a.m., Ohio Stadium (Fri.)

**June 11**  
Spring Quarter ends, 12:00 Midnight (Fri.)

### Admission and Registration Dates

<table>
<thead>
<tr>
<th>Admission Dates</th>
<th>Undergraduates</th>
<th>Graduate and Professional*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last day to file applications for Admission</td>
<td>Columbus Campus</td>
<td>Feb. 1</td>
</tr>
<tr>
<td>registration Dates</td>
<td>Regional Campuses</td>
<td>Feb. 1</td>
</tr>
</tbody>
</table>

**Scheduling**

- Continuing Students (enrolled Winter Quarter)
  - Scheduling materials released in college offices  
    (Graduate School at Registrar’s Office)—A-K Mon., L-Z Tues.
  - First day to file Schedule Cards
  - Last day to file Schedule Cards

- Returning Students (not enrolled Winter Quarter)
  - Scheduling materials released
  - First day to file Schedule Cards
  - Last day to request Schedule Cards
  - Last day to file Schedule Cards

- New Students
  - Scheduling materials released
  - First day to file Schedule Cards
  - Last day to file Schedule Cards

**Fees**

- Last day to pay fees
- Last day for withdrawal
- from the University with any refund of fees

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* Individual college calendars, last days to file applications for admission, and registration dates may vary for the professional colleges of Dentistry, Law, Medicine, Optometry, Pharmacy, and Veterinary Medicine. Consult the appropriate college office or catalog for these dates.

** New students required to participate in the Undergraduate Orientation Program will receive scheduling materials when they attend the Program.
Organization of Instructional Units

For conveniences of administration, the instructional units—colleges, schools, departments, academic faculties, and divisions—of the University are grouped as follows:

Undergraduate Colleges

COLLEGE OF ADMINISTRATIVE SCIENCE

SCHOOL
Social Work

ACADEMIC FACULTIES
Accounting
Finance
Management Science
Marketing

DIVISION
Public Administration

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

SCHOOLS
Home Economics
Natural Resources

DEPARTMENTS
Agricultural Economics and Rural Sociology
Agricultural Education
Agricultural Engineering
Agronomy
Animal Science
Dairy Science
Dairy Technology
Horticulture and Forestry
Plant Pathology
Poultry Science

COLLEGE OF THE ARTS

SCHOOL
Music

DIVISIONS
Art
Art Education
Dance

Design
History of Art
Theatre

COLLEGE OF BIOLOGICAL SCIENCES

ACADEMIC FACULTIES
Biochemistry and Molecular Biology
Biophysics
Botany
Entomology
Genetics
Microbial and Cellular Biology
Zoology

COLLEGE OF EDUCATION

SCHOOL
Health, Physical Education, and Recreation

DIVISIONS*
Men's Physical Education
Women's Physical Education

ACADEMIC FACULTIES*
Curriculum and Foundations
Early and Middle Childhood Education
Educational Administration
Educational Development
Exceptional Children
Humanities Education
Industrial Technology
Mathematics-Science Education
Special Services
The Arts in Education
Vocational and Technical Education

COLLEGE OF ENGINEERING

SCHOOL
Architecture

DEPARTMENTS
Aeronautical and Astronautical Engineering
Aviation
Ceramic Engineering
Chemical Engineering
Civil Engineering
Computer and Information Science
Electrical Engineering
Engineering Graphics
Engineering Mechanics
Industrial Engineering
Mechanical Engineering
Metallurgical Engineering
Mineralogy
Photography and Cinema
Welding Engineering

* Pending approval
COLLEGE OF HUMANITIES

DEPARTMENTS
Classics
English
German
History
Linguistics
Philosophy
Romance Languages and Literatures
Slavic Languages and Literatures

DIVISION
Asian

COLLEGE OF MATHEMATICS AND PHYSICAL SCIENCES

DEPARTMENTS
Astronomy
Chemistry
Geodetic Science
Geology
Mathematics
Physics

DIVISION
Statistics

COLLEGE OF SOCIAL AND BEHAVIORAL SCIENCES

SCHOOL
Journalism

DEPARTMENTS
Anthropology
Economics
Geography
Political Science
Psychology
Sociology
Speech

UNIVERSITY COLLEGE

OTHER DEPARTMENTS
Air Force Aerospace Studies
Military Science
Naval Science

Professional Colleges

COLLEGE OF DENTISTRY

DIVISIONS
Dentistry
Dental Hygiene

COLLEGE OF LAW

COLLEGE OF MEDICINE

SCHOOLS
Allied Medical Professions
Nursing

DEPARTMENTS
Anatomy
Anesthesiology
Medicine
Medical Microbiology
Obstetrics and Gynecology
Ophthalmology
Otolaryngology
Pathology
Pediatrics
Pharmacology
Physical Medicine
Physiological Chemistry
Physiology
Preventive Medicine
Psychiatry
Radiology
Surgery

COLLEGE OF OPTOMETRY

COLLEGE OF PHARMACY

COLLEGE OF VETERINARY MEDICINE

DEPARTMENTS
Veterinary Anatomy
Veterinary Medicine
Veterinary Microbiology and Parasitology
Veterinary Pathology
Veterinary Physiology and Pharmacology
Veterinary Preventive Medicine
Veterinary Surgery and Radiology

Graduate School
Registration Procedures

Prior to registration for classes, see the appropriate college catalog and the University Calendar (pages 4-5) for information regarding admission procedures and policies.

SCHEDULE CARDS FOR REGISTRATION

Students in residence: Schedule cards are distributed to undergraduate and professional students by the student's college office. Graduate students' schedules are distributed by the Registrar's Office.

All new students: Schedule cards are distributed by the Registrar. Students formally schedule their programs of study for one quarter at a time; they should, with their advisers, informally plan several years ahead.

PRESENTATION OF STUDY PROGRAM

Students in residence: Spring and Summer Quarter students present schedule requests for Autumn Quarter on or before August 31.

For all other quarter deadline dates, consult the University Calendar on pages 4-5.

Penalties: A fine of $5 will be assessed for the first day and $1 for each succeeding day past the deadline date to a maximum of $10.

CHANGES IN APPROVED SCHEDULES

To add courses: Upon receipt of approved schedules through the first five full class days after the start of the quarter—permission of college office.

After the fifth full class day after the start of the quarter—permission of instructor, department chairman, and dean of the student's college.

To drop courses: Withdrawal from a course after the receipt of approved schedules requires the permission of the student's college office and is permitted only to adjust unavoidable errors in registration, failure in prerequisite courses, official changes in publicized quarterly offerings, or other conditions beyond the control of the student.

For additional information refer to the Withdrawal Procedures and Policies section on pages 29-30.

Time changes: Permission of department only.

SCHEDULING PROGRAMS

Students should consult with counselors or advisers in their college offices prior to the release of schedule request cards to plan their selections of classes. The Academic Planning Guide found in the last section of this book is designed to assist in these consultations.

Caution: Students expecting to fulfill requirements by taking courses in the evening or during the Summer Quarter are cautioned that the offerings during those periods are limited. In preparing schedules, such students should consult the current quarterly Master Schedule of Classes.

INTRA-UNIVERSITY TRANSFERS

Students in good standing who wish to transfer to another college, school, or division within the University should consult a counselor in the new enrollment unit before completing the transfer and before submitting schedule cards for approval. The request for an intra-university transfer from one enrollment unit to another is made at the Admissions Office for students not enrolled in the University College.

In order to file schedule cards for the new enrollment unit at the earliest opportunity, an intra-university transfer request should be submitted during the first ten days of the quarter preceding the quarter in which the transfer is to become effective. Transfers for Autumn Quarter may be requested during the Spring Quarter if enrollment for Summer Quarter is not anticipated. Intra-university transfer requests must be submitted on or before the following deadline dates: Summer Quarter, May 1; Autumn Quarter, August 1; Winter Quarter, November 1; Spring Quarter, February 1.

A student who has been denied further registration in one college, school, or division of the University may not register in another enrollment unit of the University except by petition approved by the executive committee of the college, school, or
division he wishes to enter. A student who has been denied further registration in an enrollment unit, but who is in good standing (see Minimum Scholastic Requirements for undergraduate students on page 28), may request an intra-university transfer to another enrollment unit within the University.

RESCHEDULED COURSES
Each department is authorized to administer placement examinations to students enrolling for the first time in courses offered by that department. Following such placement examinations, a department may instruct the secretary of the college in which the student is registered to change such student’s enrollment either to a more elementary or to a more advanced course.

If, within the first four weeks of a quarter, a student’s previous preparation is demonstrably inadequate for a course in which he originally enrolled, the department concerned is empowered to instruct the college in which that student is registered to remove the course from the student’s schedule and replace it with a more suitable one.

CREDIT FOR RESCHEDULED COURSES
Credit for all rescheduled courses resulting from action under the rescheduled course rule shall count toward the fulfillment of graduation requirements unless (a) the student has previously earned University or college credit (or in a foreign language, either University, college, or secondary school credit) in a course having substantially the same subject matter content, or (b) the substituted course is one which the department, with the approval of the Council of Instruction, has established for students with inadequate preparation for college-level courses of that department.

PAYMENT OF FEES
Fees are due and are to be paid as soon as fee cards have been received from the Registrar. Early payments are encouraged for the convenience of both the student and the University.

The University reserves the right to refuse registration if fees are not paid by the date on which they are due as specified in the University Calendar.

For additional information, see the Fees and Expenses section of this catalog.

Fees and Expenses
All fees are due and payable as a part of the student’s registration before the day designated in the University Calendar. No person should come to the University for registration without money sufficient to cover all of his fees and deposits.

No student will have any privileges in the classes or laboratories until all fees and deposits are paid. Extension of the deadline for payment of fees will be given only in extreme emergency and then only through the Registrar.

COSTS
Fees which the student pays initially are nonrefundable and not applicable toward any other University fee. These include:

1. Application Fee. Each undergraduate applicant seeking admission to the University is required to pay an application fee of ten dollars ($10) which is submitted with an application for admission.

2. Acceptance Fee. Each undergraduate student enrolling for the first time in The Ohio State University is assessed an acceptance fee of twenty-five dollars ($25). This fee should be paid promptly after the student receives his acceptance fee statement.

3. Residence Hall Filing Fee. A filing fee of twenty dollars ($20) must be submitted along with a residence hall contract.

The cost for an academic year (three quarters) at The Ohio State University depends, in part, on the student. For Ohio residents who live on the Columbus campus, the
amount ranges from $1,750 to $1,900. The table below shows a typical minimum cost breakdown.

**FEES FOR ACADEMIC YEAR (Three Quarters)**
**UNDERGRADUATE COLLEGES**

<table>
<thead>
<tr>
<th>Fee</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructional Fee¹</td>
<td>$480</td>
</tr>
<tr>
<td>General Fee²</td>
<td>120</td>
</tr>
<tr>
<td>Books and Instruments (average)</td>
<td>75</td>
</tr>
<tr>
<td>Special Laboratory Fees and other deposits³ (Variable, returnable in part)</td>
<td>50</td>
</tr>
<tr>
<td>Room and Board in Residence Halls</td>
<td>1,014</td>
</tr>
<tr>
<td>Nonresidents add tuition surcharge</td>
<td>$1,050</td>
</tr>
</tbody>
</table>

¹ The instructional fee is $469 and the general fee is $75 for students enrolled on the regional campuses.
² Basic ROTC uniforms are furnished by the federal government. A deposit of $40 is required except for Naval ROTC students. This deposit will be refunded at the time the uniform is returned to the appropriate ROTC department.
³ All fees are subject to change without notice.

The student who intends to use a checking account will find that an account in Columbus will be of more value than an account at home or in some other city. An account with a Columbus bank will provide a safe place for depositing funds, will help create a local credit standing, will furnish a means of depositing and cashing checks, and will help the student to understand banking practices.

**USE OF BANK CREDIT CARDS FOR THE PAYMENT OF FEES**

Limited use of bank credit cards for the payment of fees has been initiated in the 1969-70 year. The bank credit cards that will be accepted in future quarters and the forms necessary for fee payment will be mailed to you before the beginning of each quarter. It is important to remember that the bank credit limit of your bank credit card cannot be exceeded when used for the payment of fees. Use of bank credit cards will be accepted only in an amount less than or equal to the fee assessment.

**STUDENT PERSONAL EXPENSE FUNDS**

The incoming student will save himself much time and trouble by taking a few simple precautions in regard to his personal expense money. The student should bring enough cash to cover expenses for several days. If he does not wish to carry cash, he should use travelers checks since they are readily cashed. If he does bring a check, it should be in the form of a bank draft or cashier's check. Any checks that are for the payment of fees must be drawn up for the exact amount of the fees.

The following facts concerning the cashing of checks should be borne in mind by parents and prospective students:

1. The Ohio State University does not cash checks.
2. Checks for fees will be accepted by the University, but only when the check is drawn for the exact amount of the fees.
3. Banks do not cash checks for strangers unless the check is endorsed by a customer of the bank or some person of known responsibility. This rule applies to cashier's checks, bank drafts, and certified checks.

**SPECIAL FEES — PENALTIES**

**FEES FOR LATE FILING OF SCHEDULE CARDS**

A student who fails to file his schedule card within the required time must pay a penalty of $5 for the first day and $1 for each succeeding day of delay, the maximum fine being $10. (Also see page 10, Payment of Fees.)

**FEE FOR CHANGES IN APPROVED SCHEDULE CARDS**

Changes in subjects on approved schedule cards will be made only upon the approval of the student's college office and the payment of $1 for each change involved unless such payment is waived by the college office approving the change.

**PENALTY FOR PAYMENT OF FEES WITH BAD CHECK OR UNAUTHORIZED BANK CREDIT CARD**

Any student presenting a check or bank credit card form for fees which is returned because of insufficient funds, unauthorized credit card, or exceeded credit limit will be assessed immediately a penalty of $10 and his registration canceled. Additionally, before registering again, the regular penalty for late payment will be assessed.
### FULL-TIME STUDENTS (enrolled for 7 or more quarter credit hours)

<table>
<thead>
<tr>
<th>Program</th>
<th>Instructional</th>
<th>General</th>
<th>Resident Total</th>
<th>Tuition (Nonresident)</th>
<th>Nonresident Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate Colleges</td>
<td>$160</td>
<td>$40</td>
<td>$900</td>
<td>$350</td>
<td>$553</td>
</tr>
<tr>
<td>Graduate School</td>
<td>160</td>
<td>40</td>
<td>200</td>
<td>350</td>
<td>553</td>
</tr>
<tr>
<td>Dentistry</td>
<td>280</td>
<td>40</td>
<td>320</td>
<td>350</td>
<td>670</td>
</tr>
<tr>
<td>Division of Dental Hygiene</td>
<td>208</td>
<td>40</td>
<td>248</td>
<td>350</td>
<td>598</td>
</tr>
<tr>
<td>Law*</td>
<td>195</td>
<td>40</td>
<td>235</td>
<td>350</td>
<td>585</td>
</tr>
<tr>
<td>Medicine**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School of Allied Professions</td>
<td>160</td>
<td>40</td>
<td>200</td>
<td>350</td>
<td>550</td>
</tr>
<tr>
<td>School of Nursing</td>
<td>160</td>
<td>40</td>
<td>200</td>
<td>350</td>
<td>550</td>
</tr>
<tr>
<td>Optometry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pharmacy</td>
<td>198</td>
<td>40</td>
<td>238</td>
<td>350</td>
<td>588</td>
</tr>
<tr>
<td>Veterinary Medicine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University Regional Campuses</td>
<td>166</td>
<td>40</td>
<td>206</td>
<td>350</td>
<td>556</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>40</td>
<td>240</td>
<td>350</td>
<td>550</td>
</tr>
<tr>
<td></td>
<td>150</td>
<td>25</td>
<td>175</td>
<td>350</td>
<td>552</td>
</tr>
</tbody>
</table>

* Includes Law Library Fee and Law Review, but does not include the Student Bar Association fee of $15, which is assessed the first quarter of a student's enrollment.

** Assessed by the year; see College of Medicine catalog for method of payment.

### PART-TIME STUDENTS

Part-time students (those enrolled for six or less credit hours or enrolled for one term of a Summer Quarter), shall be assessed one-half of the full fees. When fees are not evenly divisible, they shall be assessed to the next even dollar amount.

### SPECIAL UNIVERSITY AND COURSE FEES

**Health Insurance**

Although optional for most students, all international students are required to enroll each quarter for Student Health Insurance.

**Military Uniform Deposit**

Deposit for military uniform (Army and Air Force only.)

**Laboratory Fee**

Instructors shall not permit a student to engage in laboratory work unless the student has shown a receipt from the Bursar for the fees required in the course.

**Fee Assessed Certain Professional Students**

In the case of students in the professional colleges registered and receiving college credit for undergraduate non-professional courses or other special assignment, the fee assessed for Summer Quarter will be in accordance with the fees for the undergraduate colleges.

**Other Fees**

In the case of students registered and receiving college credit for the short courses, workshops, geology field trips, conservation laboratory, and those of a similar nature, the fee assessed will be in accordance with the fees for the undergraduate colleges.

**Annual fee for the Agricultural Student (Agricultural and Home Economics Students)**

2

**Annual fee for The Ohio State Engineer (Engineering students)**

1

**ABSTRACT FEES**

<table>
<thead>
<tr>
<th>Abstracts for masters' theses</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstracts for Ph.D. dissertations</td>
<td>35</td>
</tr>
</tbody>
</table>

The abstracts of master's theses and abstracts of Ph.D. dissertations are microfilmed and published in the form of a journal at the end of each quarter. A special fee for editing, printing, and binding of microfilming these abstracts is required for each person receiving such a degree from this university. This fee must be paid not later than one week before the commencement date on which the candidate expects to receive his degree.

All fees are subject to change without notice.
RETURN OF FEES ON WITHDRAWAL

Rule 43.09 of Rules for the University Faculty, a rule initiated by the Board of Trustees, states:

Section 1. Fees (except for the Application and Acceptance Fees) are returnable in part if a student withdraws from the University for any cause other than at the request of the University and if such withdrawal is made within the period of time specified in Section 2 or Section 3 of this rule. The Application Fee and the Acceptance Fee are not returnable irrespective of the reason for withdrawal.

Students dismissed from the University or withdrawing at the request of the University are not entitled to any refund of fees.

Section 2. Quarter fees will be refunded according to the following schedule:

a. From the date on which the fees were paid through the 6th day on which classes are scheduled . . . full fees less $10.

b. After the 6th day on which classes are scheduled through the 12th day on which classes are scheduled . . . 75 percent of fees are paid.

c. After the 12th day on which classes are scheduled through the 24th day on which classes are scheduled . . . 50 percent of fees are paid.

d. After the 24th day on which classes are scheduled . . . no refund of fees paid.

Section 3. Term fees will be refunded according to the following schedule:

a. From the date on which fees are paid through the 6th day on which classes are scheduled . . . full fees less $10.

b. After the 6th day on which classes are scheduled through the 9th day on which classes are scheduled . . . 75 percent of fees paid.

c. After the 9th day on which classes are scheduled through the 12th day on which classes are scheduled . . . 50 percent of the fees paid.

d. After the 12th day on which classes are scheduled . . . no refund of fees paid.

*Schedule includes Saturdays.

Section 4. In order to be eligible for the listed refund, the student must present to the Bursar—within the time listed above—written permission to withdraw, signed by the dean of his college, and must surrender his fee card to the Bursar.

Section 5. If exceptional conditions prevent the presentation of authorization to withdraw at the Bursar's Office at the proper time, and if the student has not been able to attend classes during this time, the case should be referred for decision to the Office of the Vice President for Student Affairs.

Section 6. No fees will be returned in case of withdrawal of students until 30 days have elapsed from the date of withdrawal.

Section 7. If fees are paid under mistake of law or fact, they are returnable in full.

Section 8. Fees are not returnable except as provided in this Rule 43.09.

LABORATORY FEES

These fees are considered as an integral expense of the course and will be automatically refunded according to and as part of the Return of Fees on Withdrawal schedule as discussed above.

TRANSCRIPT FEE

Every student is entitled to one copy of his University record free of charge. There will be a charge of $1 for each additional copy. The fee should accompany the transcript request.

Rules Governing Nonresident Status

The following rules governing residency status were approved by the Board of Trustees and conform with the Ohio Board of Regents Rule No. 2.

I. General Policy as to Nonresident Fees

Every student who is not a resident of the State of Ohio, as defined below, is required to pay nonresident tuition fees in addition to other University fees.

a. The status of a student as a resident or nonresident of the State of Ohio for fee purposes will be determined as of his original enrollment. In gen-
eral, that status will remain the same throughout his continued attendance at the University, although such status may be reviewed upon petition prior to the beginning of a quarter if the student believes he meets the qualifications for reclassification from nonresident to resident status as outlined in "b" below. In cases where there has been a break in the student's attendance at the University, the beginning of the current quarter of enrollment may be considered by the Registrar as the student's "original enrollment" for the purpose of residence determination.

b. A student classified as a non-resident may upon petition be considered for reclassification as a resident for fee purposes if:

1. Minor student — the parents or legal guardian of the student take up residence in Ohio and one of the parents is gainfully employed on a full-time basis.

2. Adult student — the student presents clear, convincing evidence to the University that supports a finding of exceptional circumstances justifying a change in classification. Included in the justification, but not limited to, he must have established a separate residence in Ohio for 12 months or more immediately preceding the request for reclassification and made definite commitments to enter into gainful employment in Ohio upon completion of a degree program.

c. A person shall be eligible to register as a resident for fee purposes only if he meets the following qualifications:

1. Minor student — parents or legal guardian must have resided in Ohio for twelve consecutive months or more immediately preceding enrollment, or if they reside in Ohio and at least one parent or legal guardian is gainfully employed on a full-time basis in Ohio.

2. Adult student — has resided in Ohio for twelve consecutive months or more immediately preceding enrollment; or if he is gainfully employed on a full-time basis and is residing in Ohio, and is pursuing a part-time program of instruction, and there is reason to believe that he did not enter Ohio from another state primarily to enroll in The Ohio State University.

d. Further information or clarifications may be obtained by contacting the Registrar, Room 203, Administration Building, 190 North Oval Drive, Columbus, Ohio 43210.

2. Registration

The burden of registering under the proper residence is placed upon the student. If there is any question as to residence, the matter should be brought to the attention of the Registrar and passed upon prior to original enrollment.

3. Definitions

This policy is interpreted as follows:

a. An adult student is a person 21 years of age or older.

b. A person is considered to be a minor until he has reached his 21st birthday. Married minors, however, and veterans are entitled to establish and maintain their own residency pursuant to paragraph 1-c.

c. The residency of a married woman is determined by the rules which would apply to her husband if he would seek enrollment, except that a woman who would have been classified as an Ohio resident for fee purposes immediately prior to her marriage to a nonresident may continue to be classified an Ohio resident provided she continues to live in Ohio.

d. A woman who is legally separated from her husband may establish her own residency pursuant to paragraph 1-c.

e. Federal government service personnel who entered the service from Ohio and their dependents shall be considered residents for fee purposes if they provide proof of continued Ohio domicile, such as evidence that (1) they have not acquired a domicile in another state and (2) they have maintained a continuous voting record in Ohio.

f. Personnel in the military service who enter the service from another state and their dependent children shall be classified as Ohio residents during the period of their active duty assignment in Ohio. If a person in the service changes his or her residence legally and officially to Ohio while stationed
in the state of Ohio, he and his dependents shall be classified as residents without reservation.

g. Aliens admitted to this country on immigrant visas may establish Ohio residence in the same manner as any other nonresident. All aliens admitted to this country on student visas will be classified as foreign students, and as such, nonresidents.

h. An emancipated minor who is completely self-supporting may be considered as an adult student in determining residency for fee purposes. He must present satisfactory proof that his parents, if living, neither contribute to his welfare nor claim him as a dependent for federal income tax purposes. The fact that a minor files his own federal or city income tax return is not sufficient evidence alone to substantiate emancipation.

i. The residency of any student may be reevaluated at each term of reenrollment, provided he has met all requirements for Ohio residency as stated in these rules. Changes of classification from nonresident to resident will not be made retroactive prior to the quarter or term in which application for resident classification is made.

j. The residence of any person, other than the parent or legal guardian, who may furnish funds for payment of University fees, shall in no way affect the residence of the student.

k. Proof of ownership of property in Ohio, payment of local and State taxes, Ohio automobile registration or driver's license, and the fact that a person is a legal voter in Ohio, do not, in themselves, constitute valid evidence of resident status for fee purposes. Residency for fee payment purposes is dependent upon the domicile of the student concerned.

l. An out-of-state student enrolled for a full program is considered to be in the State for the purpose of attending school, and is presumed not to be here as a permanent resident. Continued presence in Ohio during vacation periods does not of itself overcome the presumption.

m. Any nonresident student who reaches the age of 21 years, or is married while a student at any university or college in the State of Ohio, does not by virtue of such act attain residence for fee payment purpose.

n. Teachers taking up residency in Ohio preparatory to teaching in Ohio schools and colleges shall be considered residents of the state as of the effective date of their contract of professional service. This is interpreted to mean that a teacher starting to teach in September may be a resident for Summer Quarter.

o. A student classified as a resident of Ohio shall be considered to have lost his status after he, or in the case of a minor, his parents or legal guardian move their legal residence to another state.

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**Assistance Information For Students**

**Student Financial Aids**

Administration of student employment, the Work-Study Program, loans, scholarships, and grants is centered in the Student Financial Aids Office, Student Services Building, 154 West 12th Avenue. The office is open from 8 a.m. to 5 p.m. weekdays and 8 a.m. to 12 noon on Saturdays. The following services are available to assist students in need of financial aid.

**STUDENT EMPLOYMENT**

The Student Employment Office serves only registered students and their spouses. The office solicits and receives information on job opportunities on and off campus. Students submit applications and are interviewed regarding their qualifications and availability. Qualified applicants are referred to appropriate employers for consideration. Students' applications list special skills, previous experience and employment, fields of study, grades, and class schedules. A record of jobs held and reported performance is considered in future referrals. Prospective employers of graduates
often seek this information in the consideration of applicants.

Direct referrals are made only for jobs on campus or in the Columbus area. No referrals are made for commission sales or telephone solicitation jobs, although screened information on commission sales opportunities is available to interested students. Likewise, information on summer jobs outside Columbus and at camps, parks, and resorts is available. Interviews with out-of-town employers for summer positions are arranged during the Winter and Spring Quarters.

WORK-STUDY PROGRAM
The College Work-Study Program under the Economic Opportunity Act of 1964 provides financial aid through employment to college students who, without such assistance, would not be able to attain a higher education.

To qualify, students must:

Come from low-income or moderate-income families unable to contribute significantly to their education.

Need this employment income in order to attend college.

Be able to work up to 15 hours a week and maintain satisfactory grades.

Students may not work more than an average of 15 hours a week when classes are in session; when school is not in session or during vacation periods, students may work a 40-hour week. A student working full-time all summer can earn between $200 and $1,000. At 15 hours a week during the academic year, he can expect to earn $75 to $125 a month.

LOANS
The Student Financial Aids Office administers all student loans at The Ohio State University. All loans are for current educational expenses only (room, board, books, and fees) and are granted to students whose parents, guardians, or spouses are unable to provide sufficient funds to enable them to finance their education. Enrolled students are eligible to apply, but no funds can be granted to entering freshmen. First-quarter students, however, may apply for aid for their second quarter if their admission and placement tests plus previous academic records predict upper two-thirds class standing in the University. Since loan funds are limited, first consideration will go to those students having the highest combination of ability and need. A brief description of available loan funds is given below.

UNIVERSITY LOAN FUND
University and foundation loans are applied for quarterly and have a usual maximum of $300 per loan, $750 per academic year, and $1,500 total while in the University. Interest rates average 3 percent, and repayment schedules vary according to the year in college and financial needs of the student. Co-signers are required, and parent or guardian must co-sign in the case of minors.

NATIONAL DEFENSE STUDENT LOAN FUND
National Defense Student Loans are available to students who are capable of maintaining good standing and have verified financial need. Preference will be given to students with superior preparation or ability. Students with the best records and highest financial need will be given first consideration. Based on past experience, students with below-average academic records probably cannot be helped.

Students may borrow under the National Defense Loan Program an amount determined by their demonstrated financial need. If need justifies it, undergraduates may borrow to a maximum of $1,000 per academic year to a total maximum of $5,000. No interest is charged while the student is in full-time attendance at the University or for nine months thereafter. Repayments of principal and interest begin nine months after the student leaves the University and must be completed within a maximum of ten years. Quarterly repayments are required with a minimum repayment of $45 per quarter. The rate of interest is 3 percent per annum on the unpaid balance. The debt is canceled in the event of death or permanent and total disability.

If the borrower becomes a full-time teacher either in (1) a public or nonprofit elementary or secondary school or in (2) an institution of higher education, 10 percent of the loan can be canceled for each year of teaching not to exceed 50 percent of the loan. If the borrower is employed as a teacher of handicapped children or in a school with a predominance of low-income families, a 15 percent yearly cancellation is possible.
APPLICATION PROCEDURE
Loan applications for the quarters indicated are available and must be submitted during the following periods.

Winter Quarter . . . . October 15-November 15.
Spring Quarter . . . . January 15-February 15.
Summer Quarter . . . . April 15-May 15.

*Application periods for a National Defense Student Loan for the academic year.

EMERGENCY LOANS
Emergency Loans with a $50 maximum, 90-day repayment period, and no interest are also available. These emergency funds may be secured at any time during a quarter when there are sufficient funds.

BANK LOANS
The Higher Education Act of 1965 established a federal program of low-cost, guaranteed loans. These loans for a maximum of $1,500 per academic year for undergraduates are available through local participating banking institutions.

Repayments of not less than $360 per year are required and may not extend over a 15-year period after execution of the loan. Many students will be eligible for federal payment of a portion of their interest depending upon their families' incomes.

Further details concerning this program in each state and a list of participating Ohio lending institutions can be secured from the Student Financial Aids Office.

SCHOLARSHIPS
Scholarships are available to both entering and enrolled students. These scholarships are made available from various sources on the campus as well as outside foundations, industries, interested groups, and individuals. Approximately 4,500 scholarships are awarded yearly.

SCHOLARSHIPS FOR FRESHMEN
A high school student must rank in the upper fourth of his class to be eligible to apply for scholarships. In addition to class rank, applicants are considered on the basis of test scores, recommendation from the school, and financial need. A number of different scholarships, totaling about 1,200, are available.

FRESHMAN SCHOLARSHIP APPLICATION PROCEDURES
To apply for a scholarship, a freshman applicant must:

1. Send completed Parents' Confidential Statement to the College Scholarship Service before February 1. These forms are available in the high schools.
2. Send a completed Freshman Scholarship Application to the Student Financial Aids Office before March 1.
3. Have the high school principal or counselor complete a Recommendation for Scholarship and forward it to the Student Financial Aids Office before March 1. This form is furnished with the application.

Each applicant must have taken at least one of the following standardized tests:

1. American College Test.
2. College Entrance Examination Board Scholastic Aptitude Test.
3. National Merit Scholarship Qualifying Test.

Since the scores received on these tests will be forwarded by the school official who completes the Recommendation for Scholarship, it is suggested that applicants take the tests prior to the end of the first semester of their senior year.

Only those applicants whose files are complete and who have been admitted will be considered for awards. Applicants for the Columbus campus will be notified of the committee's decision by June 1.

COOPERATIVE HOUSING SCHOLARSHIPS
Cooperative housing scholarships for undergraduates are available in the Stadium Scholarship Dormitory for men and in the Alumnae Scholarship Houses for women. Because of the cooperative feature of these programs, the cost to the student for room and board is approximately $400 yearly for women and $465 for men, as compared to $1,005 in the other University residence halls. Students should indicate their interest in this program on the scholarship application. Further information describing these awards may be obtained from the Student Financial Aids Office.
REGIONAL CAMPUS SCHOLARSHIPS
The University has two-year undergraduate regional campuses located at Lima, Mansfield, Marion, and Newark. Scholarships are available for students who plan to enroll at these campuses. Applicants must secure the required forms from the regional campuses and must have the application and recommendation forms returned to the center by April 15. The Parents' Confidential Statement of the College Scholarship Service must be filed by February 15. In completing the Parents' Confidential Statement applicants must list the location of the campus, in addition to indicating "The Ohio State University."

For further information a student should contact the campus where he plans to enroll.

SCHOLARSHIPS FOR ENROLLED STUDENTS
Students now in attendance at The Ohio State University on the undergraduate level should request an "Enrolled Application" when applying for scholarships. The major scholarship awards made available to this group are the Ohio State University Scholarships. Other University-wide scholarships, including those for cooperative scholarship housing, are also available. In addition to these, a number of special scholarships are administered in cooperation with the various colleges of the University. These special scholarships for undergraduates are listed in the appropriate college catalogs. Information concerning these awards is available at the college or departmental offices as well as the Student Financial Aids Office.

Unless otherwise designated, the University's scholarship application form will be used for consideration for all awards for which an applicant may be eligible.

Scholarship applications are available November 1 and must be submitted by March 15. Applicants will be notified of the committee's decision by August 1.

SCHOLARSHIPS FOR UNDERGRADUATE TRANSFER STUDENTS
A limited number of scholarships are available each year for students transferring from other colleges and universities. Only applicants who have completed their admission to The Ohio State University are considered for scholarships, and they must have exceptionally good records to be selected. Scholarship applications are available November 1 and must be submitted by March 15. Applicants will be notified of the committee's decision by August 1.

EDUCATIONAL OPPORTUNITY GRANTS
This federal program was established under the Higher Education Act of 1965. It enables the University to award grants to students who qualify under the guidelines of the program. The primary selection criterion is the family's financial circumstances, with the major emphasis on students from low-income families.

The grants can be made to any undergraduate student, but preference is given to entering freshmen. A student's high school or college record must indicate his ability to maintain good standing in his academic work.

Application should be made on the regular scholarship application blank following the procedures and deadlines listed elsewhere in this section.

SCHOLARSHIP RENEWAL PROCEDURES
As can be noted on the scholarship listings in this section, a number of scholarships granted to entering freshmen are renewable until graduation. These scholarships may be renewed provided (1) the student maintains a point-hour ratio based on each year's performance which would place him in the upper third of his class in the college in which he is enrolled; (2) a new application is filed each year before the deadline date of March 15; and (3) adequate funds are available. Stipends for these renewal awards may vary, depending on the applicant's current financial need.

SCHOLARSHIPS AVAILABLE TO UNDERGRADUATES
The table in this section indicates the scholarships available University-wide. Unless otherwise indicated, application is to be made to the Student Financial Aids Office, following procedures listed above.

Since the number and type of available awards are constantly changing, the listing is accurate only at the time of printing. Awards added since that time will be granted to the most eligible applicants. Unless otherwise indicated, only one application to the Student Financial Aids Office is needed to be considered for every award.
### Scholarships Available In All Undergraduate Colleges

<table>
<thead>
<tr>
<th>NAME</th>
<th>ELIGIBILITY</th>
<th>NUMBER</th>
<th>YEARY STIPEND</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Force ROTC Four-Year College Scholarship Program</td>
<td>Male high school seniors who can meet AF pilot or navigator qualifications; apply to Hq. Air Force ROTC by early November.</td>
<td>4 years</td>
<td>500 National (varies locally) Instructional and General Fees. Lab Fees, Book Allowance, $35 Per Month.</td>
</tr>
<tr>
<td>Allen County Alumni Club</td>
<td>Allen County resident</td>
<td>1</td>
<td>Varies. Room &amp; Board for $400 per year. Instructional and General Fees. Lab Fees, Textbooks, and Monthly Allowance of $50.</td>
</tr>
<tr>
<td>Alumnae Scholarship Houses</td>
<td>Women</td>
<td>56</td>
<td>Same as 4-year scholarship.</td>
</tr>
<tr>
<td>Army ROTC 4-Year Scholarship</td>
<td>Male Students enrolled in the AROTC 4-year program. Must be physically qualified for military service.</td>
<td>1,200</td>
<td>Same as 4-year scholarship.</td>
</tr>
<tr>
<td>Army ROTC 3-Year Scholarship</td>
<td>Same as 4-year scholarship. Must also rank in upper 1/2 of Sophomore ROTC class and in upper 1/2 of Sophomore college class.</td>
<td>400</td>
<td>Same as 4-year scholarship.</td>
</tr>
<tr>
<td>Army ROTC 2-Year Scholarship</td>
<td>Same as 4-year scholarship. Must also rank in upper 1/2 of Junior ROTC class and in upper 1/2 of Junior college class.</td>
<td>600</td>
<td>Same as 4-year scholarship.</td>
</tr>
<tr>
<td>Army ROTC 1-Year Scholarship</td>
<td>Same as 4-year scholarship. Must also rank in upper 1/2 of Senior ROTC class and in upper 1/2 of Senior college class.</td>
<td></td>
<td>Same as 4-year scholarship.</td>
</tr>
<tr>
<td>Ashville Cardinal Food Market</td>
<td>Graduates of Westfall High School</td>
<td>1</td>
<td>$400. Freshmen Not Renewable.</td>
</tr>
<tr>
<td>Athletic Grant-in-Aid</td>
<td>Athletic ability; apply to Athletic Department, St. John Arena, 419 West Woodruff.</td>
<td></td>
<td>Varies. Freshmen Not Renewable.</td>
</tr>
<tr>
<td>Clifford C. Baltzly Scholarship</td>
<td>Male, preference to Zanesville residents</td>
<td>2</td>
<td>$150. Freshmen Not Renewable.</td>
</tr>
<tr>
<td>Boys' Club of Columbus</td>
<td>Members of Boys' Club of Columbus; apply to Director of the Boys' Club of Columbus.</td>
<td></td>
<td>Varies. Freshmen Not Renewable.</td>
</tr>
<tr>
<td>Breakfast Optimist Club of Columbus</td>
<td>Franklin County residents, preference to Central High School graduates.</td>
<td>2</td>
<td>$300. Freshmen Not Renewable.</td>
</tr>
<tr>
<td>Francis E. Brundige Foundation</td>
<td>Holmes County residents active in 4-H; apply to County Agricultural Extension Agent, Holmes County.</td>
<td></td>
<td>Varies. All Years Not Renewable.</td>
</tr>
<tr>
<td>Robert W. Butche Foundation</td>
<td>Men students enrolled in course of study leading to career in the aviation industry. Must have enrolled in Aviation 505.</td>
<td>1</td>
<td>$500. Not Renewable.</td>
</tr>
<tr>
<td>Rollin and Jessie Cockley</td>
<td>Graduates of Bellville, Ohio, High School; apply to Executive Head of the Bellville Local Schools.</td>
<td></td>
<td>Varies. Freshmen Not Renewable.</td>
</tr>
<tr>
<td>Columbus City Panhellenic Association</td>
<td>Woman, Franklin County resident.</td>
<td>1</td>
<td>$400. Freshmen Not Renewable.</td>
</tr>
<tr>
<td>Columbus Woman's Club</td>
<td>Woman, Franklin County resident.</td>
<td>1</td>
<td>$425. Freshmen Not Renewable.</td>
</tr>
<tr>
<td>Richard DeSelm Memorial Fund</td>
<td>Male member of Symphonic choir showing outstanding leadership; no application required. Students from winning Alumni Club areas; apply to local Alumni Club president.</td>
<td>1</td>
<td>Varies. Freshmen Not Renewable.</td>
</tr>
<tr>
<td>Educational Opportunity Grant</td>
<td>Graduates of Union Local High School, Milford Center, Ohio. Old Grandchildren of Russell Ewalt Tuscarawas County Residents</td>
<td></td>
<td>$200 to $1,000. Instructional and General Fees.</td>
</tr>
<tr>
<td>Edgar M. Erb</td>
<td>Woman student</td>
<td>Varies</td>
<td>Varies. Freshmen Not Renewable.</td>
</tr>
<tr>
<td>Clara C. Ewalt Memorial Fund</td>
<td>Varies. Freshmen Not Renewable.</td>
<td>$300.</td>
<td>$200. All Years Not Renewable.</td>
</tr>
<tr>
<td>Exchange Club of Dover Scholarship Fund</td>
<td>Varies. Freshmen Not Renewable.</td>
<td>Varies</td>
<td>$500. All Years Not Renewable.</td>
</tr>
<tr>
<td>Marjorie Fawcett's Women's Club Scholarship</td>
<td>Varies. Freshmen Not Renewable.</td>
<td>$500.</td>
<td>$510. All Years Not Renewable.</td>
</tr>
<tr>
<td>NAME</td>
<td>ELIGIBILITY</td>
<td>NUMBER</td>
<td>YEARLY STIPEND</td>
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<td>------------------------------------------------------------------------------</td>
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<td>---------------------------------------------</td>
</tr>
<tr>
<td>General University</td>
<td>No special requirements</td>
<td>Freshmen</td>
<td>$150 to $800</td>
</tr>
<tr>
<td>German Fraternity Exchange</td>
<td>Fraternity member majoring in German; apply to Chairman, Department of German.</td>
<td>Renewable</td>
<td></td>
</tr>
<tr>
<td>Elizabeth and Ernie Godfrey</td>
<td>No special requirements</td>
<td>Upperclass</td>
<td>Expenses for 1 year's study at the University of Goettingen in Germany</td>
</tr>
<tr>
<td>Goettingen Scholarship</td>
<td>German major; apply to Chairman, Department of German.</td>
<td>Not Renewable</td>
<td>Varies</td>
</tr>
<tr>
<td>Grand Lodge of Free and Accepted Masons of Ohio</td>
<td>Graduates of Urbana, Ohio, High Schools; apply to the Superintendent of Schools, Urbana, Ohio.</td>
<td>Not Renewable</td>
<td>Varies</td>
</tr>
<tr>
<td>William Green</td>
<td>Liberal Arts majors</td>
<td>Not Renewable</td>
<td></td>
</tr>
<tr>
<td>Grimes</td>
<td>Members of Ohio District Key Club International</td>
<td>Not Renewable</td>
<td></td>
</tr>
<tr>
<td>Stuart M. Henderson</td>
<td>All Years</td>
<td>Not Renewable</td>
<td></td>
</tr>
<tr>
<td>Charles F. High Foundation</td>
<td>Men residents of Bucyrus, Ohio, area; apply to the Secretary, Charles F. High Foundation, Bucyrus, Ohio.</td>
<td>Not Renewable</td>
<td></td>
</tr>
<tr>
<td>International Students</td>
<td>International students; apply to International Students Office.</td>
<td>Not Renewable</td>
<td></td>
</tr>
<tr>
<td>Belva Jones</td>
<td>Woman, Franklin County resident</td>
<td>Not Renewable</td>
<td></td>
</tr>
<tr>
<td>Glenn R. Joyce</td>
<td>Franklin County residents</td>
<td>Not Renewable</td>
<td></td>
</tr>
<tr>
<td>Carol S. Kennedy Scholarship Fund</td>
<td>No special requirements</td>
<td>Not Renewable</td>
<td>Varies</td>
</tr>
<tr>
<td>Martin Luther King Memorial</td>
<td>Preference to students from Southeastern Ohio.</td>
<td>Not Renewable</td>
<td>Varies</td>
</tr>
<tr>
<td>Joseph and Margaret Kore Memorial</td>
<td>Korean students; apply to the International Students Office.</td>
<td>Not Renewable</td>
<td>Varies</td>
</tr>
<tr>
<td>Martin Krumm</td>
<td>Residents of the Alumnae Scholarship Houses; apply to the Assistant for Alumnae Affairs, Alumni House.</td>
<td>Not Renewable</td>
<td>Varies</td>
</tr>
<tr>
<td>Lucy Lella</td>
<td>Graduate of the Marion-Harding High School, Marion, Ohio; apply to the Principal.</td>
<td>Not Renewable</td>
<td>Varies</td>
</tr>
<tr>
<td>Ralph T. Lewis</td>
<td>Selected by Register Foundation, Sandusky, Ohio.</td>
<td>Not Renewable</td>
<td>Varies</td>
</tr>
<tr>
<td>J. T. and Egbert H. Mack</td>
<td>Upon recommendation of Hillel Foundation</td>
<td>Not Renewable</td>
<td>Varies</td>
</tr>
<tr>
<td>Samuel M. Melton</td>
<td>Women</td>
<td>Not Renewable</td>
<td>Varies</td>
</tr>
<tr>
<td>Mortar Board Alumnae</td>
<td>Residents of counties where Mothers' Clubs have made funds available; apply to local Mothers' Club President.</td>
<td>Not Renewable</td>
<td>Varies</td>
</tr>
<tr>
<td>Mothers' Club</td>
<td>Male high school seniors or graduates who meet navy officer candidate qualifications. Apply to any Navy Recruiting Station or Naval ROTC unit by early November of year preceding college entry.</td>
<td>Not Renewable</td>
<td></td>
</tr>
<tr>
<td>Naval ROTC 4-year Scholarship Program</td>
<td>No special requirements available to transfer students.</td>
<td>Not Renewable</td>
<td></td>
</tr>
<tr>
<td>Ohio State University</td>
<td>No special requirements; apply directly to Lima, Mansfield, Marion, or Newark Campus. Deadline April 15.</td>
<td>Not Renewable</td>
<td>Varies</td>
</tr>
<tr>
<td>Regional Campus</td>
<td>No special requirements</td>
<td>Not Renewable</td>
<td>Varies</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NAME</td>
<td>ELIGIBILITY</td>
<td>NUMBER</td>
<td>YEARELY STIPEND</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
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<td>----------------------------------</td>
</tr>
<tr>
<td>Elizabeth C. Sawtell Fund</td>
<td>Conservation and Natural Resources Majors, Children of Class of 1968 men</td>
<td>1</td>
<td>$300</td>
</tr>
<tr>
<td>1968 Senior Class Memorial Scholarship Fund</td>
<td></td>
<td>Varies</td>
<td>Varies</td>
</tr>
<tr>
<td>Alfred P. Sloan</td>
<td></td>
<td>Varies</td>
<td>Varies</td>
</tr>
<tr>
<td>Stadium Scholarship Dormitory</td>
<td>Men</td>
<td>367</td>
<td>Room &amp; Board for $465 per year</td>
</tr>
<tr>
<td>Star Equipment Company and Star Industrial Supply Corporation</td>
<td>Resident of Central Ohio</td>
<td>1</td>
<td>$500</td>
</tr>
<tr>
<td>Student Leader Endowment—Beanie Drake</td>
<td>Student leaders who will need aid to continue in activities; apply to Student Leader Endowment Fund, Pomerene Hall.</td>
<td>Varies</td>
<td>Varies</td>
</tr>
<tr>
<td>University Musical Productions</td>
<td>Performers in the areas of speech, music, and dance; apply to University Musical Productions Committee.</td>
<td>Varies</td>
<td>Varies</td>
</tr>
<tr>
<td>Grace High Washburn</td>
<td>Women residents of Bucyrus, Ohio area; apply to the Secretary-Treasurer, Grace High Washburn Trust, Bucyrus, Ohio.</td>
<td>Varies</td>
<td>$500</td>
</tr>
<tr>
<td>Woman's Relief Corps</td>
<td>Student from Orphan's Home at Xenia, Ohio, who is the son or daughter of a deceased soldier; apply to Woman's Relief Corps, 3125 Braddock Street, Dayton, Ohio 45420.</td>
<td>1</td>
<td>Partial remission of fees</td>
</tr>
<tr>
<td>Leo Yassenoff</td>
<td>No special requirements</td>
<td>Varies</td>
<td>Varies</td>
</tr>
</tbody>
</table>

**Counseling**

The University provides a wide variety of counseling services for its students. Counselors in each of the undergraduate colleges assist students in the choice of courses, scheduling of classes, and interpretation of academic requirements. In addition to assisting students with course selection and registration during the orientation program, undergraduate college counselors are available throughout the year to discuss with students their academic problems, program requirements, and vocational possibilities, and to ensure that students are referred to appropriate officials who can assist with special problems.

Many faculty advisers devote a part of their time to assisting students relative to their classroom work and programs of study. The role of the faculty adviser is to help each student obtain the maximum benefit from his program of study and to make each student's educational experience as rewarding as possible.

The Counseling Center provides counseling services to assist students in dealing more effectively with questions about vocational and educational planning, reading and learning skills improvement, and personal and social adjustment, including premarital and marital counseling. Trained and experienced professional counselors are available to discuss any questions of concern to the student. If the Counseling Center is unable to provide the full assistance that a student needs, a counselor will suggest a place where further assistance is available.

The Counseling Center maintains a library of occupational information which students are welcome to use. There is also a laboratory to assist students in the improvement of reading and study skills. These services and facilities are available to all students of the University.

**Health Service**

The University Health Service is maintained on the campus to serve the outpatient health needs of the student body during the weeks classes are conducted. A well-qualified staff of physicians, including representatives from most specialties, is available to care for those conditions...
which may be adequately treated in an outpatient clinic and also to maintain liaison with family physicians. Seriously ill students and those requiring hospitalization are referred to the University Hospitals or to a hospital of the individual’s choice. Primary financial responsibility for hospital service rests with the student. Therefore, all students are urged to consider the advantage of The Ohio State University student insurance program.

**Professional Service Clinics**

**DENTAL CLINIC**

Dental services are available from the Dental Clinic to the general public.

The dental and dental hygiene clinics are open from 9:00 a.m. to 12:00 noon and from 1:30 to 4:30 p.m. during the Autumn, Winter, and Spring quarters with the exception of final examination week and the vacation period between quarters. The dental clinic is open during the summer from 8:00 a.m. to 12:00 noon beginning about the middle of July until the beginning of the Autumn Quarter. A special diagnosis clinic and an emergency service clinic are available to the public starting the week following the end of Spring Quarter and continuing until the beginning of the regularly scheduled summer clinic.

Dental treatment at the clinic is performed by junior and senior dental students working under the supervision of licensed clinical instructors. The cost of treatment is at a reduced level from that available in general practice.

**LEGAL CLINIC**

The Legal Clinic is operated by the College of Law to give advanced law students experience in handling actual legal problems for clients. The law students’ work is supervised by the Clinic faculty and staff. The Clinic gives advice and representation in a wide variety of legal matters to university students and others who cannot afford to retain a private lawyer. An appointment is necessary, and may be made by telephoning campus extension 6821, or by calling at the Clinic offices on the ground floor of the south wing of the Law Building, 1659 North High Street.

**OPTOMETRY CLINICS**

The primary purpose of the Optometry Clinics is to provide students in the College of Optometry with experience working with patients under the immediate supervision of the clinical staff. The services are available to students, staff, and faculty, and the general public. General visual examinations, the prescription and delivery of lenses and contact lenses, and other optometric services are available. Facilities of the Clinics are located at 352 West Tenth Avenue. For information or appointments, call 293-2788.

**SPEECH AND HEARING CLINIC**

The Speech and Hearing Clinic provides diagnostic and remedial services for students and non-campus residents with communication difficulties related to deficiencies of the speech and hearing processes. The Clinic is staffed and equipped to assist persons with problems such as articulatory difficulties, voice disorders, stuttering, cleft palate speech, cerebral palse speech, aphasia, esophageal speech, and hearing deficiencies. Remedial services are also available to students who speak English as a second language. Audiological services include audometric testing, lipreading instruction, auditory training, hearing aid evaluation, and speech therapy for voice and articulation problems associated with hearing loss. There is no charge for any of these services for full-time students enrolled in The Ohio State University.
Student Housing

All students applying for admission to the University may request housing accommodations on the official admission application form. Such requests will be forwarded to the Office of Student Housing, which will send housing information and a residence hall contract.

All unmarried freshmen and sophomores under 21 years of age who do not live with parents or other close relatives (defined only as grandparents, aunts or uncles, or married brother or married sister) are required to reside in University-owned residence halls.

RESIDENCE HALLS

University residence halls are designed to offer each student the opportunity to extend his education beyond the classroom to an experience in community living. Through the development of student government within each hall, men and women have opportunities to participate in self-government and in an extracurricular activity program. Each hall is staffed with professionally trained personnel to be of assistance to students in academic, social, and personal development.

The University has 12 residence halls for undergraduate women and 14 for undergraduate men, and two coeducational towers. Residence halls include those in the north campus which accommodate four students in a suite arrangement consisting of bedroom, study, and bath. Residence halls on the south campus consist primarily of double and triple rooms. The newest residence hall construction includes two towers along the Olentangy River. These halls consist of suites for 4 students developed into clusters of 16 where students share a common lounge and a bath. The towers are on a coeducational basis.

All residence halls are equipped with single beds, chests of drawers, desks, study lamps, waste-baskets, chairs, draperies, mattresses, mattress covers, and pillows. Bed linen is furnished by the University, and personal laundry facilities are provided.

DINING FACILITIES

Excellent meals, prepared under the direction of trained dietitians and experienced food service personnel, are served in an assigned dining room adjacent to each residence hall. Many of the dining rooms are arranged to provide coeducational dining. Every effort is made to provide a balanced, high-quality diet for the student. Meals are included in the housing contract in all residence halls.

RESIDENCE HALL AGREEMENTS

The University is privileged at the present time to have enough space in University residence halls to accommodate the anticipated need for student housing. It is expected that all freshmen and sophomores as well as upperclassmen desiring residence hall space can be accommodated. Continuing residence in the halls is encouraged and is based upon satisfactory academic performance and citizenship.

All students who desire to reside in residence halls sign a contract for the academic year and are obligated to maintain that contract so long as they are enrolled in the University. Permission to leave a residence hall while under contract is granted only in extreme emergencies and only by the Office of Student Housing.

A nonrefundable filing fee of $20 must accompany the residence hall contract.

All residence hall payments are made quarterly. Each quarterly payment must be made by the third business day preceding the first day of classes each quarter.

OTHER TYPES OF HOUSING FOR WOMEN

ALUMNAE SCHOLARSHIP HOUSES

Two Alumnae Scholarship Houses have been established by the Ohio State University Alumnae Council as cooperative houses for women who have high scholastic ability and definite financial need. Costs are reduced considerably through the cooperative efforts of the residents who work approximately one hour per day. Each house has facilities comparable to those offered in other University living units. Candidates must file scholarship applications in the Student Financial Aids Office by March 1 in order to be considered for occupancy in one of these houses beginning in the Autumn Quarter.
SORORITIES
Nineteen sororities on the campus have houses where active affiliated members are encouraged to live if space permits. Pledges may not reside in sorority houses.

ORGANIZED ROOMING HOUSES
There are a number of privately owned and operated boarding houses in the University area. Most of these houses provide cooking facilities. The average house has a capacity of 18 women students. Prices range from $110 to $150 per quarter for room. Some boarding houses require residency for an academic year while others require a quarter's residency. Space in boarding houses may be secured by contacting the Office of Student Housing. Students are asked to visit the campus and secure accommodations in person.

OTHER TYPES OF HOUSING FOR MEN
THE STADIUM SCHOLARSHIP DORMITORY
The Stadium Scholarship Dormitory accommodates 370 men in much the same kind of facilities as in the residence halls. Men admitted to the Stadium Scholarship Dormitory are chosen in the same way scholarships are awarded. Living costs are reduced through the efforts of the residents to maintain the dormitory. A resident normally works five to eight hours per week in return for substantial savings in room and board fees. This facility has its own dining room, study, and recreation rooms.

FRATERNITIES
A number of men enjoy the advantages of living in fraternity houses. Forty-three Greek letter organizations have for many years maintained houses which provide excellent room and board arrangements. A freshman pledge may move into a fraternity house only after obtaining written approval from the Office of Student Housing and if there is adequate space in the fraternity house. Prospective students who are interested in possible membership should write to Assistant Dean of Students, 458 Ohio Union, 1739 North High Street, Columbus, Ohio 43210.

OFF-CAMPUS HOUSING
Furnished rooms in Columbus provide housing for many men students. The rates vary from $35 to $50 a month for single rooms; $30 to $45 for double rooms (per student). Students entering the University in Autumn Quarter should visit Columbus during early summer to choose a suitable room. Students entering at times other than Autumn Quarter should arrange for a room several weeks prior to the beginning of classes. Students may visit the Office of Student Housing for assistance in securing off-campus housing information.

OPEN HOUSING POLICY
It is the policy of The Ohio State University that rental housing be available to all of the University students on equal terms without regard to race, religion, color, or national origin. This policy specifically states that no student shall become a resident of any premises which is on the discriminatory housing list which is maintained in the Office of Student Housing and published periodically. This section of the policy does not apply to students living with their parents.

The Open Housing Policy provides that upon a finding by the appropriate tribunal that a student has violated this rule, with knowledge that the premises are on the discriminatory housing list, he shall be liable to recorded probation or suspension.

UNIVERSITY HOUSING FOR MARRIED STUDENTS
Four hundred apartments for married students are available. These are one- and two-bedroom units located less than a mile from the center of the campus.

All of these apartments are unfurnished except for range, refrigerator, and disposal. Rental rates include heat and water. Some units are permanently air-conditioned, and these rent for an additional $4.00 a month.

Married students may request a married housing folder and an application by writing to the Director, Buckeye Village, 2661 Defiance Drive, Columbus, Ohio 43210.
University Academic Requirements

STUDENT RESPONSIBILITY
The student is responsible for knowing his own standing scholastically in reference to the published regulations and standards of the University and of his college.

THE MARKING AND THE POINT SYSTEM
The grade marks given in all colleges of the University are as follows:

A Highest quality of passing work; for each credit hour, 4 credit points shall be allowed.

B Second quality of passing work; for each credit hour, 3 credit points shall be allowed.

C Third quality of passing work; for each credit hour, 2 credit points shall be allowed.

D Lowest quality of passing work; for each credit hour, 1 credit point shall be allowed.

E Failed. This mark indicates (1) that the student has done failing work or (2) that he was absent from the final examination without excuse and his work in the course did not justify a passing mark. Credit for a course in which the Mark E (Failed) has been received can be obtained only by repeating and passing the work in class. (See Rule 37.09.)

H Honors. This mark shall be used only by the College of Medicine for a student enrolled in the curriculum leading to the degree Doctor of Medicine, when that student has completed a course in that curriculum with an exceptionally high degree of academic performance. H (Honors) credit shall be counted as hours only and shall not be considered in determining a student's point-hour ratio under Rule 37.05.

I Incomplete
Section 1. An I (Incomplete) indicates (1) that the work of the student in the course is qualitatively satisfactory, but that for legitimate reasons a small fraction remains to be completed; or (2) that the record of the student in the course justifies the expectation that he will obtain a passing mark, but he has been unavoidably absent from the final examination.

Section 2. The Mark I (Incomplete) shall be reported on the grade card together with the mark which the Registrar is authorized to enter on the student's official record if the work is not completed, and a different mark reported to the Registrar in the manner and within the time hereinafter provided. The instructor shall also furnish the chairman of the department or the director of the school with a statement of the work required to be completed.

Section 3. The student must complete the work and the instructor must report the final mark at the earliest possible time, but not later than six weeks following the quarter in which the I (Incomplete) was received. Upon the petition of the student within the six weeks' period, the executive committee of the college in which the student is enrolled (or, if not enrolled, of the college of last enrollment) may for good reason allow a student additional time in which to complete the work. Generally, this shall not be longer than the end of the quarter following the quarter in which the I (Incomplete) was received. Any decision of the executive committee extending the period shall set forth the time in which the student shall complete the work, and a copy of the decision shall be forwarded to the Registrar.

Section 4. As soon as the incomplete work has been made up, the instructor, or in the case of his absence from the University, the department chairman or the director of the school, shall file the proper mark in the Registrar's Office. Until such time as the final mark is recorded, the credit hours in the incomplete course shall not be counted or considered for any
purpose except that of men’s inter-
collegiate athletic eligibility.

Section 5. In no case shall a student
who has received the mark I (Incom-
plete) be permitted to repeat the
course in which such mark was re-
ceived until such time as the I (In-
complete) has been removed in the
manner hereinafter provided, and
then only in such cases as fall within
Rule 37.09.

P Progress. This mark may be used to
indicate that the student has shown
satisfactory progress in courses other
than individual studies courses that
extend over more than one quarter.
Until such time as a final mark is re-
corded, the credit hours in a P (Pro-
gress) course shall not be counted for
any purpose. When a final mark is re-
corded, all previous P hours shall
assume the value of the final mark.

R Audit. This mark indicates that the
student has registered to audit the
course. No credit hours shall be
awarded for this mark. (See Rule
37.11.)

S/U—Satisfactory/Unsatisfactory.
The mark S may be used to record
either satisfactory progress in or com-
pletion of work, provided that the
course has been approved for this
mark by the Dean of the College offer-
ing the course, and in the case of
courses carrying graduate credit, by
the Graduate Council. It shall be used
as an alternative to U or I in individ-
ual-studies courses numbered 593,
693, 793, 993, 998, and 999, and on
satisfactory completion by a graduate
student of a literature review course
or seminar designated by the Dean of
the Graduate School as qualifying for
the mark of S. S credit shall be counted
as hours only and shall not be con-
sidered in determining a student’s
point-hour ratio under Rule 37.05.

The mark U shall be used for
unsatisfactory work in courses in which a
student would be entitled to the
mark of S if his work had been satis-
factory. No credit shall be given for
work marked U. This grade shall not
be considered in determining a stu-
dent’s point-hour ratio under Rule
37.05.

T Temporarily excused. This mark ap-
plies only to military science, Air
Force aerospace studies, or naval sci-
ence; physical education; or health
education. No credit hours shall be
awarded to a course in which a stu-
dent received a T (Temporarily ex-
cused) mark.

X Permanently excused. This mark ap-
plies only to military science, Air
Force aerospace studies, or naval sci-
ence; physical education; or health
education. No credit hours shall be
awarded to a course in which a stu-
dent received an X (Permanently ex-
cused) mark.

PA/NP—Pass/Non-Pass
This grading pattern may be chosen for:
(a) Any or all of the University re-
quired courses of physical edu-
cation and health education.
(b) Twelve credit hours of courses
in Military Science, Air Force
Aerospace Studies, or Naval
Science; or the substitute for
them which is twelve credit
hours of courses not otherwise
specified in the degree require-
ments of the student’s curricu-
ulum.
(c) an additional maximum of 15
hours of work.

The 15 hours noted in “c” above are
confined to undergraduate students
enrolled in degree-granting colleges
who have accumulated point-hour ratios of 2.00 or higher. In addition, courses required or specified as re-
quired electives in the curriculum
leading to the degree for which a stu-
dent is a candidate may not be taken
on a Pass/Non-Pass basis.

Hours graded PA or Pass count to-
wards the degree, and PA/NP (or
Pass/Non-Pass) are not computed in
the point-hour average of the student.

After an instructor is notified of the
Pass/Non-Pass decision, he will sub-
mit PA or NP to the Registrar, con-
sistent with that decision, in the case
of each student making the election.

University and college rules for add-
ing and deleting courses apply to
courses elected on a Pass/Non-Pass
basis. For the purpose only of calcu-
liking final standing in a course, the
grade Pass is the equivalent of the
grade A, B, C, or D and the grade
Non-Pass, of the grade E.
Examination

Section 1. This mark indicates credit given to students registered in the University on the basis of examinations taken prior to or after admission to the University. The level of achievement which must be demonstrated by the student on these examinations in order to receive EM (Examination) credit shall be determined by the department or school in which the course for credit is being given is taught. This credit, up to a maximum of 45 quarter credit hours, or of 70 quarter credit hours in the case of students registered in the School of Nursing who have completed diploma nursing programs and are licensed registered nurses, shall be assigned only upon the authorization of the chairman of such department or the director of such school and with the approval of the executive committee of the college in which the student is registered. Additional examination quarter credit hours may be assigned in the same manner but only with the prior approval of the Faculty Council.

Section 2. Examination credit shall not be given to a student for a course in which he has received a mark at this university. No credit points are allowed for courses in which a mark of EM (Examination) is given.

K Credit. This mark shall be used for work credited from other institutions and service schools and by the Director of Admissions only. K credit shall be counted as hours only and shall not be considered in determining a student's point-hour ratio under Rule 37.05.

WF Withdrawn failing
WP Withdrawn passing

Repetition of Courses

A student who has received a mark of E (Failed) or NP in a required course at this university may repeat the course for credit only as provided in Faculty Rule 37.07. A student who has received a mark of E (Failed) or NP in any other course at this university may repeat the course for credit at his option.

An undergraduate or professional student who has received a grade of D (lowest quality of passing work) in a course at this university may repeat the course for credit only upon the recommendation of the executive committee and with the approval of the dean of his college. A graduate student, as defined in Faculty Rule 41.03, may, when approval is given by an adviser, repeat for credit any course in which he has received a grade of D (lowest quality of passing work).

An undergraduate or professional student, as defined in Rule 41.03, who has received a grade of A, B, C, or PA in a course taken at this university or elsewhere, may repeat the course only as an auditor, upon receipt of permission of the chairman of the department or director of the school and the dean of his college. A graduate student, as defined in Rule 41.03, may, after a period of five years, and when approval is given by the graduate committee of his department and Dean of the Graduate School, repeat for credit a course in which he has received a mark of A, B, or C.

A student who has audited a course may subsequently repeat the course for credit with the permission of the executive committee of his college.

The credit hours for a repeated course shall in no case be counted more than once in meeting graduation requirements.

Removal of Failure in a Required Course

A student is responsible for repeating in class, at his first opportunity, a required course in which he has failed, unless the executive committee of the college authorizes a substitute course.

Alteration of Marks

At the close of each quarter, the Registrar's Office notifies each student by mail of the marks earned during the quarter. These marks become a part of the official record of the student and are not subject to change except upon official authorization of the chairman of the department or director of the school and the dean of the college. Such changes shall be made only when a clerical error has been discovered.

The Point-Hour Ratio

A student's academic standing for a quarter is expressed by his point-hour ratio. This ratio is determined by dividing the total number of points earned by the total number of credit hours scheduled or undertaken. Courses in which the marks EM, H,
I, K, NP, P, PA, R, S, T, U, X, WF, or WP are given are not included in the computations. The following is an example: A = 4.0, B = 3.0, C = 2.0, D = 1.0, E (Failed) = 0.

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Hours</th>
<th>Grade</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course No. 1</td>
<td>5</td>
<td>A</td>
<td>20</td>
</tr>
<tr>
<td>Course No. 2</td>
<td>3</td>
<td>C</td>
<td>6</td>
</tr>
<tr>
<td>Course No. 3</td>
<td>(3)</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>Course No. 4</td>
<td>3</td>
<td>E</td>
<td>0</td>
</tr>
<tr>
<td>Course No. 5</td>
<td>3</td>
<td>B</td>
<td>9</td>
</tr>
</tbody>
</table>

Point-hour ratio: 2.50

When the final grade on Course No. 3 is recorded, the points and hours will be included in the computation of the student’s point-hour ratio. When a student has a record for two or more quarters, he will have a cumulative point-hour ratio determined by dividing the total points earned by the total hours undertaken.

UNIVERSITY CLASS RANKING SYSTEM

The class standing of students in all the undergraduate colleges is determined on the basis of total credit hours completed and recorded as follows:

<table>
<thead>
<tr>
<th>Rank</th>
<th>Earned Credit Hours</th>
<th>Schedule Card Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman</td>
<td>0–48</td>
<td>1</td>
</tr>
<tr>
<td>Sophomore</td>
<td>49–97</td>
<td>2</td>
</tr>
<tr>
<td>Junior</td>
<td>98–146</td>
<td>3</td>
</tr>
<tr>
<td>Senior</td>
<td>147–195</td>
<td>4</td>
</tr>
<tr>
<td>Fifth Year</td>
<td>196 and more</td>
<td>5</td>
</tr>
</tbody>
</table>

Students enrolled in the professional divisions or colleges of Allied Medical Professions, Dentistry, Education-Professional, Engineering-Professional, Law, Medicine, Nursing, Optometry, Pharmacy, and Veterinary Medicine begin their ranking over again, as follows:

<table>
<thead>
<tr>
<th>Rank</th>
<th>Schedule Card Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Year</td>
<td>1</td>
</tr>
<tr>
<td>Second Year</td>
<td>2</td>
</tr>
<tr>
<td>Third Year</td>
<td>3</td>
</tr>
<tr>
<td>Fourth Year</td>
<td>4</td>
</tr>
</tbody>
</table>

Should there be any doubt in a student’s mind concerning the correctness of his ranking in the professional divisions and colleges, he should consult with the division or college concerned.

Students enrolled in the Graduate School receive the rank of either M (Master’s) or P (Ph.D.).

WARNING, PROBATION, AND DISMISSAL: MINIMUM SCHOLASTIC REQUIREMENTS*

These requirements shall apply only to undergraduate students. The academic standards controlling warning, probation, and dismissal of professional and graduate students shall be established by rule by the faculties of the colleges in which the professional students are registered, or of the Graduate School if the student is a graduate student.

The promulgation of these rules, and their amendment or repeal, shall be subject to the approval of the Board of Trustees.

A transfer student from another university who is admitted to advance standing in this university shall have his point-hour ratio and deficiency points computed only upon work done at this university.

In order to be in good academic standing at this university, a student must carry a cumulative point-hour ratio of 2.00 or better. A student whose point-hour ratio is less than 2.00 will be subject to warning, probation, or dismissal based upon his previous record and the number of deficiency points he possesses.

Deficiency points are defined as the number of points a student would need in order to raise his cumulative point-hour ratio to 2.00. (See previous section on point-hour ratio). A student with a point-hour ratio greater than 2.00 is said to have no deficiency points. Deficiency points may be calculated by subtracting the number of points earned from twice the number of credit hours attempted for the grades A, B, C, D or E.

A student who has between one and fourteen deficiency points will be warned by his college office that he is in academic difficulty.

A student who has 15 or more deficiency points is subject to academic dismissal from the university or to probation. A student will be placed on probation after the first quarter in which he accumulates 15 or more deficiency points; and the college in which he is registered will indicate to him what conditions he must meet in order to continue to enroll at the University. At the end of each succeeding quarter the college will review his record and will take appropriate action to restore him to good standing, to place him on warning, continue him on probation, or dismiss him as the facts of

*Subject to final approval by the Board of Trustees.
Withdrawal Procedures and Policies

WITHDRAWAL FROM COURSE
Withdrawal from a course after the start of the quarter is permitted only to adjust for unavoidable errors in registration, failure in prerequisite courses, official changes in publicized quarterly offerings, or other conditions beyond the control of the student. The student is expected to plan his program carefully before scheduling and then register for the specific courses he intends to pursue for the entire quarter. Deviations from a normally required program should be discussed with a counselor, preferably before scheduling and definitely no later than the beginning of the quarter.

A request for withdrawal from a course because of emergency circumstances beyond the student's control, such as severe illness or accident or comparable situation, must be discussed with a counselor in the student's college office.

If the request is approved, a change ticket issued at the college office must be submitted within 24 hours at the Scheduling Office for a schedule change.

COMPULSORY COURSE WITHDRAWAL
An enrollee of any undergraduate college who fails to attend a scheduled course before Saturday noon of the first week of classes, may, at the option of the department, be disenrolled immediately from that course. In the event a department chooses to take such action, it will be the responsibility of the department chairman to notify the student's college office. A change ticket removing the course from the student's schedule will be prepared in the college office, and a copy shall be forwarded to the Office of the Registrar (Faculty Rule 41.07).

WITHDRAWAL FROM THE UNIVERSITY
A student who desires to withdraw from the University must apply to the dean of his college for permission to withdraw. If the student severs his connection with the University at any time during the quarter without communicating with the dean
of his college, he will be marked as having failed in all of his courses for the quarter.

Between noon of the sixth Saturday, and noon of the eighth Saturday of a quarter, an undergraduate student may withdraw from one or more courses, or all courses, and his official permanent record shall bear the notation WP if he withdrew passing or the notation of WF if he withdrew failing.

After noon of the eighth Saturday of a quarter, an undergraduate student may withdraw from one or more courses, or all courses, and his official permanent record shall bear the notation WP if he withdrew passing or the grade E if he withdrew failing.

When a student withdraws from the University during a quarter, his parent or guardian shall be notified of the fact by the secretary of the college (Rule 47.01).

Graduation Requirements

49.03 REQUIREMENTS FOR AN UNDERGRADUATE DEGREE*

To obtain an undergraduate degree from this University an undergraduate student must:

a. Have been enrolled in the College, the Colleges of the Arts and Sciences, or the School recommending that degree during the last two quarters of work necessary to complete the degree requirements. The Executive Committee of the College, the Colleges of the Arts and Sciences, or the School recommending the degree may waive this requirement to the extent of not more than one quarter’s enrollment if the student has six quarters in full-time residence (to be in full-time residence in any quarter a student must be enrolled in courses carrying twelve or more quarter hours credit) at this University, including a minimum of forty-five quarter hours credit at this University during the junior and senior years.

b. Have earned through regular course enrollment a minimum of forty-five quarter hours credit from this University.

c. Have satisfactorily completed the number of credit hours required for the curriculum he is pursuing. The minimum number of credit hours required in each curriculum shall include the credit hours required under Rules 31.0701 and 31.0703; however, excuses granted under Rule 31.0705 shall not reduce the stated minimum number of credit hours required in the curriculum for a degree or a certificate.

Credit hours are considered as “satisfactorily completed” only if the student has received, at this University, the mark A, B, C, D, EM, K, S, or FA in those hours (see Rule 35.07).

d. Have earned credit points (see Rule 37.03) totaling at least twice the number of credit hours attempted at this University for which calculable grades (A, B, C, D, or E) were given.

e. Have satisfactorily met all additional college and curricular requirements for the degree involved.

f. Have filed an application for the degree in accordance with rules prescribed by the College or School.

REQUIREMENTS FOR A GRADUATE OR PROFESSIONAL DEGREE (Rules 49.05 and 49.07)

To obtain a graduate or professional degree from this university, the graduate or professional student must have met the minimum requirements established by the graduate council or the college recommending the degree and approved by the Board of Trustees.

DEGREES AND CERTIFICATES

Degrees and certificates are awarded by the Board of Trustees upon the recommendation of the college faculties, or the Graduate Council, and the Faculty Council, as transmitted to the Board by the President.

REQUIRED COURSES

Each college has certain requirements which must be met by every student seeking to earn a degree in that college. The specific course requirements for the curricula administered by a given college can be found in the catalog for that college. In addition to these, the University has established certain requirements outlined below.
REQUIRED COURSES
FOR MEN AND WOMEN STUDENTS

All students entering any of the undergraduate colleges, schools, or divisions, including Allied Medical Professions, Nursing, and Dental Hygiene, are required to schedule:

1. One hour of physical education each quarter offered until a total of three quarters of credit has been earned.
2. One hour of health education during one of the first three quarters offered, and thereafter, if necessary, each quarter until 1 credit hour has been earned.

Transfer to other colleges of this university shall not constitute a waiver of unfulfilled requirements of this rule.

UNIVERSITY REQUIRED COURSES
IN BASIC EDUCATION
AND NATIONAL DEFENSE STUDIES

Every curriculum in the undergraduate colleges includes a body of courses from which 45 credit hours must be selected to ensure that each student is given the opportunity to become acquainted with the three basic areas of academic study—the humanities, the social sciences, and the natural sciences—by selecting 15 credit hours in each of these three areas. These courses are specifically stated in the individual college catalogs under the heading Academic Requirements. The objectives of this part of the curriculum, as set forth by the University faculty, are as follows:

Students transferring from other colleges or universities can meet part or all of the following requirements with approximately equivalent courses. Credits for each transfer student shall be reviewed by the Director of Admissions and the appropriate college, and credit in all courses which meet the spirit of these Basic Education Requirements shall be accepted.

HUMANITIES (15 credit hours)

The objectives are to introduce the student to his possibilities for continuing growth as a thoughtful and reasoning person, sensitive to the aspirations and attainments of others; to acquaint him to at least some degree with the treasures of human thought and expressions at his command; and to develop in him a continuing desire to have his full share of the legacy of all creative efforts.

SOCIAL SCIENCES (15 credit hours)

The objectives are to make sure that the student has at least a basic understanding of the fundamental ideas upon which our society has been built, the social institutions through which these ideas have been given effective meaning, and the never-ending process of development through free choice limited only by concern for the rights and well-being of others. Emphasis will be put upon the values of a free society and the responsibility of the individual for participating actively in the issues and decisions of the day.

NATURAL SCIENCES (15 credit hours)

The objectives are to acquaint the student with the kinds of problems which lend themselves to possible solutions through the use of science, to introduce him to differing scientific techniques through significant illustrative experience, to give him a sense of perspective in the development of science, and to develop in him an understanding of the basic community of all scientific disciplines.

NATIONAL DEFENSE OPTION

In addition to the above requirements, all students enrolled in these colleges will select one of the following:

Either

a) Twelve credit hours of courses in Military Science, Air Force Aerospace Studies, or Naval Science which offer the freshman an excellent opportunity to learn more about defense problems and the military service so that he can make an informed decision to continue his military training or to terminate it at the end of two years,

Or

b) Twelve credit hours of courses not otherwise specified in the degree requirements of the selected curriculum.

EXCUSES FROM REQUIRED COURSES

The college in which a student is enrolled may excuse a student from course requirements imposed by that college.

The requirements of physical education and health education are University requirements. The President and the depart-
ments of instruction directly concerned may grant by faculty regulation excuses from these courses.

GRADUATE CREDIT FOR UNDERGRADUATES
An undergraduate may work towards graduate credit provided:

1. Three years of coursework have been completed.
2. The credit for the course is not necessary to complete baccalaureate degree requirements.
3. His cumulative point-hour ratio is 2.70 or above.

4. Permission is secured from:
   a. The course instructor.
   b. The secretary of the student's college.
   c. The Office of the Graduate School before he registers for graduate courses.

A grade of B or better must be achieved, and the credit for these courses may not be used until the student has been admitted to the Graduate School and until the department in which he wishes to specialize accepts the work. Fifteen quarter hours of such work is the maximum which may be counted toward an advanced degree.
Office of Educational Services

OFFICERS
John T. Benner, Jr.................... Vice President
Office: 106 Administration Building—282-8951
Robert W. McCormick.............. Assistant Vice President
for Continuing Education
Office: 2170 Neil Avenue—282-4571
Richard B. Hull........... Director of Telecommunications Center
Office: 2170 North Star Road—282-6641
Dean Cannon........... Director of Teaching AIDS Laboratory
Office: 3 Lord Hall—282-7255
Paul Finsmeyer............. Director of Listening Center
Office: 83 Dewey Hall—282-8850
Lewis C. Branscomb............. Director of Libraries
Office: 280 Main Library—282-6152
Robert Wagner........... Director of Film and Photography
Office: 204 Havet Hall—282-4900
Robert P. Moody, Colonel........ Professor of Air Force
Aerospace Studies
Office: 333 Military Science Building—282-4411
Paul N. Horton, Colonel........ Professor of Military Science
Office: 204 Military Science Building—282-6073
James M. Mason, Captain..... Professor of Naval Science
Office: 188 Naval Annex, Physical Education Building—
282-6016
James Miller........... Director of Alumni Records
Office: 48 Alumni House—282-5599

DIVISION OF CONTINUING EDUCATION
The main office of the Division of Continuing Education is located in Archer House, 2130 Neil Avenue. The branch office, for the administration and counseling of students enrolled in academic undergraduate credit courses, is located in Room 12, Brown Hall, 190 West 17th Avenue.
Both offices are open from 8 a.m. to 5 p.m., Monday through Friday, and from 8 a.m. to 12 noon on Saturday.

HISTORY OF THE DIVISION
The continuing education programs of The Ohio State University have developed gradually over the years. This development has been twofold:
1. Through noncredit workshops, seminars, and short courses developed and offered by the various colleges, departments, and schools, and
2. Through the offering of undergraduate credit course opportunities.

In October of 1961, the Board of Trustees of the University, recognizing the expanding requirements in these areas, gave the formal responsibility for this development to a new administrative division, the Office of Part-time and Continuing Edu-

CREDIT COURSE INFORMATION

Objectives
The Ohio State University recognizes that there are many adults who desire to pursue university academic undergraduate credit programs which are not essentially degree-oriented but are in many cases related to occupational, professional, or personal purposes and needs.

Organization
With this objective in mind, adult students (normally 21 years of age or over) are enrolled in the Division of Continuing Education on the central campus or on the regional campuses rather than in one of the undergraduate colleges of the University. The Division is responsible for the administration and academic counseling of these students.

CATEGORIES OF STUDENTS

Adult Special Students
These are students who desire to take university-level undergraduate credit courses because of personal interests and occupational or vocational upgrading but who are not pursuing a degree or a public school certification program. They may or may not already have college degrees.

Transient Students
These are undergraduate students who are pursuing degrees at other colleges or universities and who wish to take courses at this university. They may enroll for one quarter, and the credit courses taken are those recommended by the college or university which will award the degree.

Admission Procedures
Students in the above categories who wish to enroll but who do not anticipate becoming candidates for University degrees may obtain application materials from the Admissions Office of the University (Admission Building, 190 North Oval Drive, Columbus, Ohio 43210). General in-
Inquiries should be directed to the Division of Continuing Education.

Students applying for admission will be required to furnish sufficient academic and employment information on the application forms to enable the Division and the Admissions Office to determine eligibility for admission on a sound academic basis.

A student under dismissal from one of the colleges of the University or from another academic institution will be accepted for admission as an adult student only by action of the Executive Committee of the Division of Continuing Education and the Admissions Office.

FEES, REGISTRATION, AND OTHER POLICIES AND PROCEDURES

Students enrolled in this division must comply with the same policies and procedures as regular students. This includes fees, academic standards, and registration procedures.

CURRICULUM

Students enrolled in this division may take any undergraduate-level courses for credit offered by the University provided they have met the individual course prerequisites. Courses may be scheduled either during the day or evening. These course offerings are described in the University Academic Policies and Course Offerings catalog.

SCHEDULE OF COURSES

The times at which each course is offered are indicated in the Academic Planning Guide found in the last section of this catalog. In preparing schedules, consult the current quarterly Master Schedule of Classes, which may be secured without charge at the Office of Continuing Education.

CREDIT

Students enrolled in this division will receive full University academic undergraduate credit for work satisfactorily completed. In order to receive graduate credit, students must be enrolled in the Graduate School.

STUDENTS DESIRING A DEGREE

Adult students who are candidates for University degrees must be admitted to and registered in one of the University’s undergraduate colleges, the Graduate School, or a professional college. Such students should apply to the Ohio State University, Admissions Office, 190 North Oval Drive, Columbus, Ohio 43210.

Adult students who are registered in this division as non-degree students and who decide to undertake academic work leading to degrees will be required to file applications for transfer to degree-granting colleges of the University, and all academic work taken will be evaluated at that time in terms of the proposed degree programs. Such students must complete all the qualifications for degrees outlined in the appropriate portions of this catalog. The filing of complete credentials will be required at this time.

Adult students enrolled for certification purposes, either on full-time or part-time bases, must be admitted to and registered in the appropriate colleges.

WORK AS AN AUDITOR

Those students who wish to be admitted for the purpose of auditing a given University course may do so after satisfying the appropriate entrance requirements and provided permission of the professor and the dean of this division are secured. There is no reduction in fees for students so admitted and registered.

NONCREDIT CONFERENCES AND SHORT COURSES

The Division of Continuing Education is responsible for the coordination of all of the noncredit conferences, seminars, and workshops developed by the colleges, schools, and departments of instruction of the University.

Continuing education is an integral part of the programs of a university dedicated to graduate and professional education. As President Noyce G. Fawcett has said: “Knowledge is expanding today with unprecedented rapidity. Men and women in a variety of occupations now must return frequently to the University campus to match their competencies with advances in many fields.” In recognition of this concept, the University’s Board of Trustees has given approval to a multimillion-dollar project, the Center for Tomorrow, which is currently under construction. This center will house the following areas of University activity: Division of Continuing Education, Telecommunications Center, the Mershon Center for Education in National Security, the Division of Alumni Records, and the Ohio State University Alumni As-
DEPARTMENTS

TELECOMMUNICATIONS CENTER

The administrative responsibility for the educational services in the areas of television, radio, and teaching aids is placed in the Office of Educational Services. Questions regarding these areas should be directed to the appropriate office as listed above.

AIR FORCE AEROSPACE STUDIES

Students interested in seeking a commission in the United States Air Force may qualify by completing either the four-year or two-year Air Force ROTC program. Both programs consist of a curriculum of aerospace studies designed to produce a junior officer who is a competent leader and administrator, articulate, knowledgeable, and capable of assuming executive duties upon graduation.

The Four-Year Program

The four-year aerospace studies curriculum consists of the General Military Course (GMC) taken during the freshman and sophomore years and the Professional Officer Course (POC) taken during the junior and senior years. The GMC consists of one classroom hour and one laboratory hour per week each quarter for six quarters. The POC consists of three classroom hours and one laboratory hour per week each quarter for four quarters.

During the freshman and sophomore years, students may achieve cadet non-commissioned officer rank. During the junior and senior years, students become cadet officers. Each is issued an Air Force officer's uniform which he keeps upon graduation. During the junior and senior years, the student receives $50 per month plus certain other compensations which total over $1,400 during the two years. A limited number of students qualify for Air Force full scholarships which pay for all fees and books, plus $50 per month.

Students in the four-year program attend a four-week summer encampment at an active Air Force base, normally between the junior and senior years. They are provided round-trip transportation (airline or reimbursement for automobile travel), food, lodging, medical care, and pay of $193.20 per month.

Students enrolled in five-year college programs may be granted non-attendance (leave) status during the third or fourth year.

The Two-Year Program

The two-year Air Force ROTC program may be pursued by any student, graduate or undergraduate, who plans to spend two full years on campus after enrolling. Students enrolled in a four-year college program take the two-year ROTC program during their junior and senior years. Students in a five-year college program may take ROTC during any two years following completion of the sophomore year. During the summer immediately prior to admission to the two-year Air Force ROTC program, a student must complete a six-weeks' summer encampment at an active Air Force base. Roundtrip transportation, food, lodging, medical care, and pay of $161.28 are provided students attending the six-week summer encampment. Students in the two-year program receive the same $50.00 per month and other compensations received by students in the four-year program.

Students in either the two-year or four-year program who qualify and apply for Air Force pilot training are given, at no extra cost to the student, a University course of flight instruction consisting of 36 1/2 hours of flight in a light aircraft and leading to a private pilot's license.

Students in both two- and four-year programs participate in overnight field trips to space flight centers and Air Force bases such as Cape Kennedy, Florida, Vandenberg Air Force Base, California, and others, as a regular part of the curricula. Transportation on the field trips is provided in Air Force aircraft.

Upon graduation the student may go directly to active duty or may apply for a delay in his call to active duty for from two to four years to pursue graduate studies. Graduates who go directly to active duty are eligible after one year to apply
for graduate study under the Air Force Institute of Technology (AFIT). Officers pursuing graduate studies under AFIT receive full pay and allowances while attending universities as full-time students.

Completion of 12 quarter hours in either the four-year or two-year Air Force ROTC program will satisfy the additional electives requirement set forth under Graduation Requirements in the undergraduate information section of this catalog.

Students enrolled formally in the Professional (Advanced) Officer’s Course of Air Force ROTC are deferred from Selective Service induction. Students in the General (Basic) Course who express interest in and are qualified for Professional (Advanced) Course enrollment may apply for military deferment. Deferment, if granted, is effective until completion of a normal undergraduate course of instruction provided the student continues his Air Force ROTC enrollment and maintains satisfactory academic progress toward graduation.

MILITARY SCIENCE

In accordance with the Morrill Act of 1862, under which this university was established, military instruction is included in the curriculum. Pursuant to this and through governmental contract, the University established a Senior Division of the Army Reserve Officers Training Corps (ROTC). The Department of Military Science administers this unit and offers courses in military science to young men who wish to enroll in the program on a voluntary basis. The general objective of the program is to produce junior officers who by their education, training, and inherent qualities are suitable for continued development as officers in the United States Army.

Two types of programs are offered and conducted concurrently: a four-year (12-quarter) program, and a two-year (6-quarter) program. Both lead to a commission and a tour of active duty in the United States Army upon completion of college studies and receipt of a baccalaureate or higher degree.

The four-year program consists of two parts: the Basic Course extending over the freshman and sophomore years and the Advanced Course during the junior and senior years. Successful completion of the Basic ROTC course, or credit in lieu thereof for prior equivalent training or service, is a prerequisite for the Advanced Course. The Basic Course also satisfies the University’s Basic Education and ROTC requirement as explained in this catalog under Graduation Requirements.

Enrollment in the Advanced Course is elective on the part of the student but is confined to those selected by the professor of military science. Such selection is based upon grades attained in military science and other academic work and upon demonstrated potential in leadership and other attributes of commissioned officers.

Students selected for and formally enrolled in the Advanced Course are paid $50 a month. For a six-week period of summer camp between the two Advanced Course academic years, they will receive approximately $180 plus travel expenses to and from camp. An Army officer uniform is furnished each student. This uniform becomes the property of each student receiving a commission.

The two-year program is, academically, exactly the same as the Advanced Course already described. Enrollment is accomplished by application approximately six months prior to the Autumn Quarter for which the student plans to enroll. Any student, graduate or undergraduate, who will have at least six academic quarters remaining on campus may apply. Selections are made by Headquarters, First United States Army. If selected, the student attends a six-week summer camp which replaces, for him, the Basic Course.

Students formally enrolled in the Advanced Course and those in the Basic Course who express interest in and are qualified for Advanced Course enrollment may apply for a military deferment from Selective Service induction. This deferment, if granted, is effective until completion of normal undergraduate course of instruction provided the student continues his Army ROTC enrollment and maintains satisfactory academic progress toward graduation.

The University Flight Training Program is open to qualified cadets with expenses paid by the Army.

A scholarship program has been instituted by the Department of the Army, awarding both two-year and four-year scholarships. Two-year scholarship recipients are selected from cadets in the Basic Course, while four-year scholarships are awarded to high school graduates prior to
their entering the University. The scholarships provide for all fees required in a course of study, as well as for books and materials and, in addition, pay the recipient $50 a month for the periods of actual attendance. During the time that the recipient attends summer camp, he is paid one-half the base pay of a second lieutenant with less than two years' service, plus travel expense both ways.

Graduates are normally commissioned in the branch of the Army for which their University training has best prepared them. Distinguished military students who desire to make the Army a career may be commissioned in the Regular Army. All other graduates are commissioned in the United States Army Reserve. Minimum active duty obligation for Reserve officers is two years. Active duty may be delayed for the purpose of graduate work. Applications for such delay are acted upon at Headquarters, First United States Army.

NAVAL SCIENCE

Students enrolled in the NROTC Program are classified as either “Contract” or “Regular”; both classifications defer the enrolled student from the draft. The naval science courses are normally taken during four consecutive years. Five-year students are granted leave for one year during either the third or fourth year.

Contract Students

Contract students are furnished uniforms and naval science textbooks all four years and are paid $50 a month during the junior and senior years. They must have had high school math, including algebra and trigonometry. Contract students are required to complete a course in American Military Affairs and a course in National Security Policy before graduation. Candidates enrolled in engineering, physics, chemistry, mathematics, and education with teaching majors in mathematics and physical science must complete three quarters of calculus, three quarters of physics or chemistry, and one quarter of computer and information science by the end of the third year in the NROTC Program. Candidates enrolled in arts, humanities, business, political science, economics, and education with teaching majors in non-physical science or mathematics areas, must complete three quarters of calculus or statistics; three quarters of physics, chemistry, biological science, or earth science; and one quarter of computer and information science by the end of the third year in the NROTC Program. Contract students will be required to make one six-week, all expense paid, at-sea training period aboard an operating Navy ship. This at-sea training period is scheduled between the junior and senior years. Students receive pay at the rate of $102.30 a month for this period. Upon graduation they receive Reserve commissions in the Navy or Marine Corps and serve three years on active duty, after which they may apply for Regular commissions or extended active duty, or return to civilian life in an inactive Reserve status to complete six years' service.

Students interested in the program may make application to the professor of naval science while on campus during their orientation visits or at any convenient time during the summer.

Regular Students

Regular students are preselected through a process starting with a nationwide, competitive examination in December of the previous year. They are furnished uniforms and all books, have fees paid, and receive $50 a month as a retainer during the four-year program. They are required to complete the same academic requirements as the Contract students. The Regular students participate in three summer, at-sea training periods, two of which are eight-week training periods at sea on operating ships of the Navy; the third is an eight-week field trip to amphibious and aviation bases. Upon graduation they are commissioned in the Regular Navy or Marine Corps and serve four years on active duty. At the conclusion of that time, they may apply for transfer to inactive duty in the Reserve to complete six years' service.

During the senior year, Regular and Contract students may apply for flight training, which will commence upon their commissioning.

PRESIDENT'S ANNUAL REVIEW

The President's Annual Review is a combined Army, Navy, and Air Force ROTC exercise held during each Spring Quarter. This is an integral part and the final practical exercise of the training laboratory curriculum.
UNIVERSITY CREDIT FOR MILITARY TRAINING

A total of 12 quarter hours of credit in military science is granted for non-commisioned service and 18 hours of credit is granted for completion of officers training upon presentation of official records after admission.

The University also grants credit for college-level courses taken through the United State Armed Forces Institute if it does not duplicate credit taken previously and if it is completed with satisfactory standing.

ARMED FORCES FOR WOMEN

Women college juniors and seniors are eligible to apply for officer's commission in one of the branches of the Armed Forces—Army, Navy, Air Force, or Marine Corps. A graduate who successfully meets all requirements and is accepted for one of the programs will be given officer training. This training may come prior to or after commissioning, depending upon the program selected. The Army, Navy, and Marine Corps also offer programs for training in the summer following the junior year.

Salary is paid during training, and uniforms, medical care, quarters, and meals are provided by the government.
Courses of Instruction

The following pages present the descriptions of courses of instruction offered by the University at the undergraduate, graduate, and professional levels. The departments, schools, and colleges which offer the courses are arranged in alphabetical order.

The courses in each are preceded by the names of faculty members with the rank of professor, associate professor, assistant professor, and instructor in that department, school, or college. These lists are accurate as of October 1, 1969.

The sample provided below itemizes some of the varieties possible.

EXPLANATION OF COURSE LISTINGS

A The course number: 631 (An “H” prefix indicates the course is open only to students enrolled in college honors programs, and others as designated by departments.)

Note—This catalog reflects the University’s new Classification and Course Numbering System, which appears in detail in the following section.

A dagger (†) denotes that the course will not be offered this year.

An asterisk (*) indicates that the course is offered every other year.

(531) Number of course under previous number system. Students with credit for this course under this number are not permitted to enroll in it again under the new number system (unless the course is stated as being repeatable).

The instructional level: UG

UG = Undergraduate

UG = Advanced Undergraduate and Graduate

UG = Graduate

P = Professional (for professional students enrolled in that particular college)

Credit hours: 5

The course title: Structural Design V

B 1 Quarters of Offerings:

Su. = Summer

W. = Winter

A. = Autumn

Sp. = Spring

Summer Quarter is further divided into 1st Term and 2nd Term. See the University Calendar at the back of any catalog for dates. Lack of staff or low student enrollment may preclude offering a course, particularly at the advanced level, every quarter for which it is authorized.

2 Classroom and laboratory hours: 3 cl., 2 2-hr. labs. In the sample provided, the 5 hours of credit are earned through satisfactory completion of coursework which involves attending class three days a week and attending two 2-hour laboratory periods each week.

3 Prerequisites: 673, Engr. Mech. 605, or 3rd yr. standing. The course number(s) or other information indicates the preparation or classification required to enroll in the course. If no department name is listed, the course number refers to the specific course within the same department. If a class standing such as “3rd-year standing” is listed, only students with that or higher class level are eligible for enrollment. The school, department, or college office should be consulted in cases of question as to eligibility for taking the course.

The number of the course implies the prerequisites listed in the University Classification and Course Numbering System shown in the following section.

4 Additional information affecting a student’s enrollment in a course: Not for credit to students majoring in Civil Engineering.

5 Repeatability Clause: The repeatability clause indicates the maximum number of hours a course may be repeated for credit.

6 A brief description of the course:

Basic theory and design of reinforced concrete structures.

Instructor’s name: Tilton.

7 Fee: The course fee indicates an additional charge assessed for the course over and above the regular quarterly instructional fees charged. (See page B-1.)

C The decimal subdivisions:

The numbers 631.01 and 631.02 indicate subdivisions of the generic number, 631. Whenever decimals appear, a student should register for the entire number (including the desired decimal subdivision) rather than the generic number alone.
## UNIVERSITY CLASSIFICATION AND COURSE NUMBERING SYSTEM

Established 1967-68, the system of numbering courses offered by the University is as follows:

<table>
<thead>
<tr>
<th>NUMBERS</th>
<th>COURSES</th>
<th>PREREQUISITES</th>
</tr>
</thead>
<tbody>
<tr>
<td>000-099</td>
<td>Non-Credit Courses (except certain seminars and colloquia)</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Orientation courses;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Remedial courses;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experience courses with student not under direct supervision of faculty;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Courses with credit added to graduation requirements.</td>
<td></td>
</tr>
<tr>
<td>100–299</td>
<td>Courses Providing Undergraduate Credit Only</td>
<td></td>
</tr>
<tr>
<td>100–199</td>
<td>Basic courses providing undergraduate credit, but not to be counted on a major or field of specialization in any department;</td>
<td>None, or specified course(s) numbered 100–199.</td>
</tr>
<tr>
<td></td>
<td>Beginning courses, required or elective courses which may be prerequisite to other courses.</td>
<td></td>
</tr>
<tr>
<td>200–299</td>
<td>Basic courses providing undergraduate credit which may be counted on a major or field of specialization (in your and/or other departments).</td>
<td>45 qtr. hrs. in collegiate courses, exclusive of ROTC and Physical Education; or</td>
</tr>
<tr>
<td></td>
<td>Specified course(s) numbered 100–199; or</td>
<td></td>
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<tr>
<td></td>
<td>Satisfactory placement on entrance examinations when applicable.</td>
<td></td>
</tr>
<tr>
<td>300–499</td>
<td>Courses Providing Undergraduate Credit or Professional Credit</td>
<td></td>
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<tr>
<td></td>
<td>Intermediate courses providing undergraduate credit which may be counted on a major or field of specialization;</td>
<td>90 qtr. hrs. in collegiate courses, exclusive of ROTC and Physical Education; or</td>
</tr>
<tr>
<td></td>
<td>Basic courses in the professional divisions of the colleges of Education and Engineering;</td>
<td>Specified course(s) numbered 100–399.</td>
</tr>
<tr>
<td></td>
<td>Basic courses in the colleges of Dentistry, Optometry, Pharmacy, and Veterinary Medicine.</td>
<td></td>
</tr>
<tr>
<td>NUMBERS</td>
<td>COURSES</td>
<td>PREREQUISITES</td>
</tr>
<tr>
<td>---------</td>
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</tr>
<tr>
<td>500-699</td>
<td>Undergraduate Courses Which Provide Undergraduate Credit and Which May Provide Graduate Credit For Graduate Students Registered in Sections of Courses Taught by Members of the Graduate Faculty; Courses Providing Professional Credit and Which May Provide Graduate Credit for Graduate Students Registered in Sections of Courses Taught By Members of the Graduate Faculty.</td>
<td>15 qtr. hrs. in courses in the same discipline numbered 200 or higher; or</td>
</tr>
<tr>
<td>500-599</td>
<td>Intermediate courses providing undergraduate credit which may be counted on a major or field of specialization, and may (or may not) provide graduate credit only in other departments; Intermediate courses in the professional divisions of the colleges of Education and Engineering; Intermediate courses in the colleges of Dentistry, Optometry, Pharmacy, and Veterinary Medicine; Basic courses in the colleges of Law and Medicine.</td>
<td>10 qtr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 qtr. hrs. in courses numbered 200 or higher in specified allied disciplines. Baccalaureate degree.</td>
</tr>
<tr>
<td>600-699</td>
<td>Advanced undergraduate courses which provide undergraduate credit that may be counted on a major or field of specialization, and may (or may not) provide graduate credit (in your and/or other departments); Advanced courses in professional divisions and professional colleges.</td>
<td>15 qtr. hrs. in courses in the same discipline numbered 300 or higher; or</td>
</tr>
<tr>
<td>700-799</td>
<td>Courses Which Provide Graduate Credit For Graduate Students Registered in Sections of Courses Taught by Members of the Graduate Faculty and Which Provide Undergraduate or Professional Credit. Courses Which Provide Professional Credit and Which May Provide Graduate Credit for Graduate Students Registered in Sections of Courses Taught by Members of the Graduate Faculty. Graduate courses providing undergraduate and graduate credit. Undergraduate credit may be counted on a major or field of specialization for high ability undergraduates; Advanced courses in professional divisions and professional colleges.</td>
<td>10 qtr. hrs. in courses numbered 300 or higher in the same discipline, plus 10 qtr. hrs. in courses numbered 300 or higher in specified allied disciplines.</td>
</tr>
<tr>
<td>800-999</td>
<td>Courses Providing Graduate Credit Only</td>
<td>15 qtr. hrs. in courses in the same discipline numbered 400 or higher plus additional specified course(s) numbered 600 or higher.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 qtr. hrs. in courses in the same discipline; or 20 qtr. hrs. in the same discipline plus 25 qtr. hrs. in specified allied disciplines.</td>
</tr>
</tbody>
</table>
Accounting

Office: 452 Hagerty Hall, 1775 South College Road

Professors: McCollough (Chairman), Burns, Dickerson (Emeritus), Fortig, Heckerl (Emeritus), Kindig, Kollaritsch, Livingstonton, McCoy, Shonting (Emeritus), and Stanley; Associate Professors: Brush, Burnham, Greenball, Johnson, Northrup, and Vanasse; Assistant Professors: Allen, Bartos, Battaglia, Bauml, Bolon (Emeritus), Gordon and Li.

201 (510) U 5
Outline of Accounting
A, Sp. 5 cl.
Not open to students with credit for 211 or equiv.
Survey of accounting in modern business; intended for students whose major is in fields other than business.

211 (501) U 5
Introduction to Accounting
Su, A, W, Sp. 5 cl.
H211 (honors) may be available to students enrolled in a college honors program or by permission of faculty.
Prereq.: Econ. 200, 201, or equiv.
Not open to students with credit for 211 or equiv.
The uses of accounting reports in management decisions and in control of business enterprises.

212 (502) U 5
Introduction to Accounting
Su, A, W, Sp. 5 cl.
H212 (honors) may be available to students enrolled in a college honors program or by permission of faculty.
Prereq.: Econ. 200, 201, or equiv.
Not open to students with credit for 211 or equiv.
The uses of accounting reports in management decisions and in control of business enterprises.

221 (503) U 5
Accounting Methods
Su, A, W, Sp. 5 cl.
Prereq.: 212 or equiv.
The application of accounting techniques to recording and reporting financial information; special emphasis given to accounting systems and the use of working papers.

415† (624) U 5
Factory Costs
5 cl.
Prereq.: 212 or equiv.
Not open to majors in Acc.
Survey of industrial cost accounting for the student whose major interest is in fields other than accounting.

493 U 2-5
Individual Studies
Prereq.: Written permission of instructor.
Repeatable to a maximum of 10 cr. hrs.
Individual study projects in selected areas in accounting.

494 U 2-5
Group Studies
Prereq.: Written permission of instructor.
Repeatable to a maximum of 30 cr. hrs.
Group study projects in selected areas in accounting.

523 (605) U 4
Financial Accounting
Su, A, W, Sp. 4 cl.
Prereq.: 221 or equiv.
Not for graduate credit for majors in Acc.
Analysis and interpretation of financial statements, advanced study of concepts of asset valuation and income determination.

524 (605) U 4
Financial Accounting
Su, A, W, Sp. 4 cl.
Prereq.: 221 or equiv.
A continuation of 523 with special emphasis on the accounting entity and business combinations.

525 (603) U 4
Cost Accounting
Su, A, W, Sp. 4 cl.
Prereq.: 221 or equiv.
Not open to students with credit for 415 or equiv.
Not for graduate credit for majors in Acc.
Basic concepts and techniques of industrial accounting; historical and standard costs; budgeting; management use of cost accounting information.

526 (641) U 4
Tax Accounting I
Su, A, W, Sp. 4 cl.
Prereq.: 212 or 212 or equiv.
Not for graduate credit for majors in Acc.
Fundamentals of federal, state, and local taxation, with major emphasis upon the federal income tax provisions having common application to all types of taxpayers.

531 (623) U 3
Principles of Automatic Data Processing
Su, A, W, Sp. 2 cl. 1 2-hr. lab.
Prereq.: 212 or equiv. and Econ. 442 or equiv. or permission of instructor.
The principles of processing business data automatically; the uses and limitations of computers in business; techniques used in formulating and solving business problems on computers.

535 (719) U 4
Advanced Cost Accounting
Sp. 4 cl.
Prereq.: 525 or equiv.
Advanced study of selected applications of cost accounting concepts to management problems involving performance measures with emphasis on budgetary control and standard costing.

536 (642) U 3
Tax Accounting II
Sp. 3 cl.
Prereq.: 221 and 526 or equiv.
Accounting

Office: 452 Hagerty Hall, 1775 South College Road

Professors McCollough (Chairman), Burns, Dickerson (Emeritus), Fertig, Heckert (Emeritus), Kindig, Kollaritsch, Livingstone, McCoy, Shonting (Emeritus), and Stanley; Associate Professors Brush, Burnham, Greenball, Johnson, Northrup, and Vanasse; Assistant Professors Allen, Bartos, Battaglia, Baumler, Bolon (Emeritus), Gordon and Li.

201 (510) U 5
Outline of Accounting
A, Sp. 5 cl.
Not open to students with credit for 211 or equiv.
Survey of accounting in modern business; intended for students whose major is in fields other than business.

211 (501) U 5
Introduction to Accounting
Su, A, W, Sp. 5 cl.
H211 (honors) may be available to students enrolled in a college honors program or by permission of faculty.
Prereq.: Econ. 200, 201, or equiv.
Not open to students with credit for 201 or equiv.
The uses of accounting reports in management decisions and in control of business enterprises.

212 (502) U 5
Introduction to Accounting
Su, A, W, Sp. 5 cl.
H212 (honors) may be available to students enrolled in a college honors program or by permission of faculty.
Prereq.: Econ. 200, 201, or equiv.
Not open to students with credit for 201 or equiv.
The accrual interpretation of transactions and fundamentals of income determination, uses of financial statements by persons outside the firm.

221 (503) U 5
 Accounting Methods
Su, A, W, Sp. 5 cl.
Prereq.: 212 or equiv.
The application of accounting techniques to recording and reporting financial information; special emphasis given to accounting systems and the use of working papers.

415 U 5
 Factory Costs
5 cl.
Prereq.: 212 or equiv.
Survey of industrial cost accounting for the student whose major interest is in fields other than accounting.

493 U 2-5
Individual Studies
Prereq.: Written permission of instructor.
Repeatable to a maximum of 10 cr. hrs.
Individual study projects in selected areas in accounting.

494 U 2-5
Group Studies
Prereq.: Written permission of instructor.
Repeatable to a maximum of 10 cr. hrs.
Group study projects in selected areas in accounting.

523 (605) U 4
Financial Accounting
Su, A, W, Sp. 4 cl.
Prereq.: 221 or equiv.
Not for graduate credit for majors in Acc.
Analysis and interpretation of financial statements, advanced study of concepts of asset valuation and income determination.

524 (606) U G 4
Financial Accounting
Su, A, W, Sp. 4 cl.
Prereq.: 221 or equiv.
A continuation of 523 with special emphasis on the accounting entity and business combinations.

525 (603) U G 4
Cost Accounting
Su, A, W, Sp. 4 cl.
Prereq.: 221 or equiv.
Not open to students with credit for 415 or equiv.
Not for graduate credit for majors in Acc.
Basic concepts and techniques of industrial accounting; historical and standard costs; budgeting; management use of cost accounting information.

526 (641) U G 4
Tax Accounting I
Su, A, W, Sp. 4 cl.
Prereq.: 201 or 212 or equiv.
Not for graduate credit for majors in Acc.
Fundamentals of federal, state, and local taxation, with major emphasis upon the federal income tax provisions having common application to all types of taxpayers.

531 (623) U G 3
Principles of Automatic Data Processing
Su, A, W, Sp. 2 cl. 1-2 hr. lab.
Prereq.: 212 or equiv. and Econ. 442 or equiv. or permission of instructor.
The principles of processing business data automatically; the uses and limitations of computers in business; techniques used in formulating and solving business problems on computers.

535 (719) U G 4
Advanced Cost Accounting
Sp. 4 cr.
Prereq.: 525 or equiv.
Advanced study of selected applications of cost accounting concepts to management problems involving performance measures with emphasis on budgetary control and standard costing.

536 (642) U G 3
Tax Accounting II
Sp. 3 cl.
Prereq.: 221 and 526 or equiv.
Advanced study of complex problem areas in taxation confronting the professional tax advisor, emphasizing the structure of tax provisions and opportunities for planning and control.

627  (735) U G 5
Auditing Principles and Procedures
Su, A, W, Sp.  5 cl.
Prereq.: 524 and 525 or equiv.
Basic concepts and standards of auditing; audit procedures and working papers; internal and external audit reports.

628  (713) U G 4
Accounting Practice
Su, A, W, Sp.  4 cl.
Prereq.: 524 and 525 or equiv.
A study of the accounting concepts and standards underlying corporate and non-corporate financial statements, including consideration of typical accounting problems.

688  (740) U G 15
Field Work in Accounting
Open only to students who hold internships with public accounting firms or with industrial concerns, for which advance approval has been given by the department. 15 cr. hrs. and one qtr. of residence added to graduation requirements for students in this course.

693  (799) U G 2-5
Individual Studies
Prereq.: Written permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Individual reports on selected accounting problems in the following fields of accounting; registration for this course number to be followed by the letter designating the field of study.
  a. Auditing
  b. Budgeting
  c. Cost Accounting
  d. Systems
  e. Taxes
  f. Theory

694  U G 2-5
Group Studies
Prereq.: Written permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Registration to be followed by the letter designating the field of study.
  a. Auditing
  b. Budgeting
  c. Cost Accounting
  d. Systems
  e. Taxes
  f. Theory

711  (643) U G 3
Introduction to Management Accounting
A, Sp.  3 cl. and conf.
A survey of accounting principles from the viewpoint of management; income measurement; analysis and interpretation of accounting data, internal reports.

712  (644) U G 3
Introduction to Management Accounting
Su, W.  3 cl. and conf.
Prereq.: 711 or equiv.
Continuation of 711.

811  (801) G 3
Business Controls
A, Sp.
Prereq.: Two qtrs. or equiv. of Acc. and admission to the M.B.A. program.
Not for graduate credit for majors in Acc. Examination of business planning and the controls over operations and property; the use of accounting data in the management enterprise.

831  (724) G 3
Accounting Systems
W.  3 cl.
Prereq.: 524 and 525 or equiv.
The principles underlying the design and installation of accounting systems.

844  (817) G 3
Theory and Practice
Su, A.  3 cl.
Prereq.: 524 or equiv.
Readings, reports, and advanced problems in accounting.

845  (820) G 3
Controllership
Su, A.  3 cl.
Prereq.: 30 cr. hrs. in Acc. or equiv.
The accounting executive's role in the management of an enterprise; accounting data for planning, coordination, control, and protection.

846  (812) G 3
Advanced Tax Accounting
W, Sp.  3 cl.
Prereq.: 526 or equiv.
Tax alternatives and tax planning; tax research; potentiating problems and procedures.

847  (713) G 3
Advanced Auditing
W, Sp.  3 cl.
Prereq.: 627 or equiv.
Growth of the auditor's liability and its effects on auditing procedures; advanced auditing problems; discussion of current material affecting the auditing profession.

851†  (828) G 3
Accounting Problems of Financial Institutions and Fiduciaries
W.  3 cl.
Prereq.: 30 cr. hrs. in Acc. or equiv.
Accounting principles and problems peculiar to banks, insurance companies, brokerage and investment houses, receivers, executors, and trustees.
Aeronautical and Astronautical Engineering

Office: 528 Civil and Aeronautical Engineering Building, 2030 Neil Avenue
Professors Von Eschen (Chairman), Burggraf, Ede, Gatewood, Lee, Li, and Stewartson (Visiting); Associate Professors Bailey, Gregorsk, Mallott, Nerem, and Patrle; Assistant Professor Young.

400 (681) U 4
Elements of Aeronautics and Astronautics
W. 4 cl.
Prereq.: Physics 133 and Math. 254.
An integrated study at an intermediate level of dynamics, fluid mechanics, propulsion, and light weight structures as related to aeronautical and astronautical engineering.

401 (682) U 4
Elements of Aeronautics and Astronautics
Sp. 4 cl.
Prereq.: 400.
Continuation of 400.

480 U 4
Mathematical Methods in Aeronautical and Astronautical Engineering
W. 4 cl.
Prereq.: Math. 416.
Application of selected topics in mathematics to analysis in the field of aeronautical and astronautical engineering.

500 (683) U 4
Flight Vehicle Structures I
W. 4 cl.
Prereq.: 401 and Math. 416.
Load distributions, temperature distributions, and allowable stresses for flight vehicle structures; derivations of basic equations for analysis of flight vehicle structural components.

505 (688) U 4
Thermodynamics
A. 4 cl.
Prereq.: 401.
Introduction to the properties and behavior of aerodynamic fluids from microscopic and macroscopic points of view.

520 U 4
Flight Vehicle Dynamics
W. 4 cl.
Prereq.: 480.
Not open to students with credit for 620 and 725.
Introduction to the concept of dynamic stability and to the dynamics of rigid aircraft and satellite vehicles.

570 U G 4
Viscous Flow and Heat Transfer
W. 4 cl.
Prereq.: 660.
Not open to students with credit for 770 and 771.
Fundamentals of viscous flow, laminar and turbulent boundary layers, aerodynamic heating, effects of body forces and acceleration, elements of radiative transfer.

594  (698)  U 3-5
Group Studies in Aeronautical and Astronautical Engineering
A, W, Sp.  3-5 cl.
Prereq.: Permission of dept.
Repeatable to a maximum of 15 cr. hrs.
Special studies in aeronautical and astronautical engineering are undertaken to satisfy various nonrecurring needs for aeronautical and astronautical subject matter outside of the normal course structure of the department.

600†  (704)  U G 4
Aerodynamics
A.  4 cl.
Prereq.: 505.
Derivation of fundamental equations governing internal and external aerodynamic flows.

603  (705)  U G 4
One-Dimensional Gasdynamics
A, W.  4 cl.
Prereq.: 505.
One-dimensional compressible flow including chemical reactions.

606†  (729)  U G 4
Motion and Deformation of Flight Vehicles
A.  4 cl.
Derivation of the basic equations and methods of analysis governing the motions, deformations, and resulting stresses encountered by flight vehicles.

620†  (724)  U G 4
Stability and Control of Flight Vehicles
Sp.  4 cl.
Prereq.: 606.
Standard stability and control analysis, introduction to system response analysis.

640  (730)  U G 4
Flight Vehicle Structures II
A, Sp.  4 cl.
Stress analysis of flight vehicle structures.

641  (731)  U G 4
Structural Design of Flight Vehicle Components
A.  2 cl., 2 3-hr. labs.
Prereq.: 640.
Design of joints; tension, bending, shear, and compression members; diagonal tension beams, box beams, and pressure structures.

660  (708)  U G 4
Classical Aerodynamics
A.  4 cl.
Prereq.: 401.
Fundamentals of steady incompressible, non-viscous aerodynamic flows with applications to airfoils and finite wings.

661  (707)  U G 4
Compressible Aerodynamics
W, Sp.  4 cl.
Prereq.: 503 and 660.
The fundamentals of the aerodynamics of compressible fluids.

673  U G 4
Biological Fluid Mechanics for the Engineer
W.  4 lec.
Prereq.: Elec. E. 670 and Math. 255; or permission of instructor.
Study of pulsatile flows, low Reynolds number flows, turbulence, and separated flow phenomena as they pertain to biological systems and biomedical engineering applications.

693  (799)  U G 2-10
Individual Studies in Advanced Aeronautical and Astronautical Engineering
Prereq.: Written permission of dept.
Repeatable to a maximum of 15 cr. hrs.
Special studies in aeronautical and astronautical engineering in one or more areas, including aircraft structures, aerodynamics, propulsion, flutter and vibration, and stability and control.

694  (798)  U G 2-10
Group Studies in Aeronautical and Astronautical Engineering
Prereq.: Written permission of dept.
Repeatable to a maximum of 15 cr. hrs.
Special advanced topics in aeronautical and astronautical engineering with the specific area under consideration announced.

695  (790)  U 1
Senior Seminar
W.  1 cl.
Prereq.: Aero-Astro. E. senior standing.

710  (713)  U 4
Aeronautical Laboratory
A.  2 cl., 2 3-hr. lab.
Prereq.: Aero-Astro. E. 5th yr. standing.
Laboratory demonstrations and experiments in aerodynamics, aerelasticity, propulsion, and structures of flight vehicles.

711  (714)  U G 2-4
Advanced Aeronautical Laboratory
W.  4-8 lab. hrs.
Prereq.: Permission of dept., and 710 or equiv.
The solution of problems in aero-space engineering by experimental methods.

715  (740)  U 4
Preliminary Design of Flight Vehicles
A, Sp.  2 cl., 2 3-hr. lab.
Prereq.: Aero-Astro. E. senior standing.
720† (725) U G 4
Stability and Control of Flight Vehicles
Sp. 4 cl.
Prereq.: 520 or 620.
To alternate with 726.

725 (787) U G 4
Analytical Dynamics of Astronautics
W. 4 cl.
Prereq.: 606 or equiv.
Satellite orbit analysis and multi-staging of rockets.

726† (788) U G 4
Perturbation of Satellite Orbits
Sp. 4 cl.
Prereq.: 520 or equiv.
To alternate with 720.
General analysis of satellite orbit perturbations; application to several specific cases.

740† (746) U G 4
Thermal Stresses in Aircraft and Missiles
W. 4 cl.
Prereq.: 640.
Theory of thermal stresses, aerodynamic heating and structural effects due to heating.

745 (754) U G 4
Aeroelasticity
W. 4 cl.
Prereq.: 640 and 660.
Dynamic loads analysis of elastic flight vehicles subjected to unsteady airloads.

746† (755) U G 4
Aeroelasticity
W. 4 cl.
Prereq.: 745.
Continuation of 745.

750 (763) U G 4
Principles of Flight Vehicle Propulsion
A, Sp. 4 cl.
Prereq.: 661.
Functional characteristics and performance of rocket, ramjet, turbojet, turbo-propeller, pulse jet, and hybrid engines.

751 (764) U G 4
Advanced Propulsion
W. 4 cl.
Prereq.: 750.
Characteristics and performance of air breathing flight vehicle power plants and their components (inlets, turbo-machinery, combustors, and expansion nozzles).

760 (772) U G 4
Advanced Compressible Flow
A. 4 cl.
Prereq.: 661.
Two-dimensional supersonic flow theories.

761 (773) U G 4
Advanced Aerodynamics
Sp. 4 cl.
Prereq.: 661.
Prediction of pressure distributions, forces, and moments of lifting configurations.

765† (785) U G 4
Fundamentals of Atmospheric Fluid Dynamics
Su, Sp. 4 cl.
Prereq.: 570 or permission of instructor.
To alternate with 767.
Advanced level of treatment of basic topics in the dynamics and thermodynamics of atmospheric motion.

767† (787) U G 4
Selected Problems in Oceanic Circulation
Sp. 4 cl.
Prereq.: 570 or permission of instructor.
To alternate with 765.
First course for advanced students interested in the application of fluid mechanical principles to oceanic circulations.

770 (775) U G 4
Aerodynamics of Viscous Fluids
A. 4 cl.
Prereq.: 661.
The elements of laminar and turbulent boundary layers in incompressible flows.

771 (778) U G 4
Aerodynamics of Viscous Compressible Flows
Sp. 4 cl.
Prereq.: 570 and 603.
Analysis of laminar and turbulent boundary layers in high speed flows.

775 (779) U G 4
Hypersonic Flows I
W. 4 cl.
Prereq.: 661.
Introduction to the analysis of inviscid hypersonic flow fields.

800 G 4
Theory of Deformation and Flow
A. 4 cl.
Prereq.: 570, 603, and 640.
General treatment of the basic principles underlying the mechanics of deformable media from both macroscopic and microscopic points of view. Burggraf and Gatewood.

802 (873) G 4
Analytical Methods in Engineering I
A, W, Sp. 4 cl.
Prereq.: 661.
Advanced methods for solution of partial differential equations with applications to fluid dynamics; topics include Green’s functions, method of characteristics, numerical methods, and asymptotic solutions. Burggraf, Gatewood, Li, and Mallett.
803* G 3
Analytical Methods in Engineering II
Sp. 3 cl.
Prereq.: 802.
Continuation of 802 with emphasis on the solution of singular perturbation problems as they arise in fluid mechanics. Burggraf, Gatewood, Li, and Mallett.

805 G 3
Aerodynamics of Chemically Reacting Fluids
A. 3 cl.
Prereq.: 505.
The aerodynamics of one-dimensional compressible flow with chemical reactions and wave propagation. Edse.

810 (823) G 3
Flight Vehicle Performance Analysis
Su, A, W, Sp. 3 cl.
Prereq.: 750 and 761.

815 (715) G 4
Experimental Methods in Aerodynamics
Sp. 8 lab.
Prereq.: 710 or permission of instructor.
Repeatable to a maximum of 12 cr. hrs.
Experimental approach to aerodynamics; similarity concepts, facilities, design of experiments, and interpretation of measurements.

820 (821) G 3
Advanced Flight Vehicle Stability and Control
Su, A, W, Sp. 3 cl.
Prereq.: 725.
Advanced studies in stability of systems, non-linear systems, Liapunov method, dynamics in extra-terrestrial atmospheres, new control methods. Mallett.

825 (822) G 3
Advanced Analytical Dynamics of Astronautics
A, W, Sp. 3 cl.
Prereq.: 725.
Advanced study in transfer orbits, satellite rendezvous, satellite attitude control, and lunar and planetary missions. Mallett.

840 (841) G 3
Inelastic Structural Analysis
A, W, Sp. 3 cl.
Prereq.: 649.
The inelastic analysis of space structures and structural components subjected to thermal, uniaxial, and biaxial loads. Bailey and Gatewood.

841 (842) G 3
Advanced Aerelasticity
A, W, Sp. 3 cl.
Prereq.: 746.
The effects of compressibility, three-dimensional flow, and structural heating on the static and dynamic response of elastic and inelastic flight vehicles subjected to steady and unsteady loads. Bailey and Gatewood.

842 (843) G 3
Advanced Structures for Flight Vehicles
A, W, Sp. 3 cl.
Prereq.: 640.
Advanced analysis and design of aircraft structures and/or structural components including thermal, inelastic, and buckling effects. Bailey and Gatewood.

850 (861) G 3
Non-Equilibrium Flow Dynamics
A, W, Sp. 3 cl.
Prereq.: 603.
Relaxation, dissociation, waves (sound, shock) nozzle flow and design collisional energy transfer in gases. Edse and Li.

851 (862) G 3
Advanced Propulsion Problems
A, W, Sp. 3 cl.
Prereq.: 751.
Combustion instability, free radicals as energy source, space propulsion problems, noise of exhaust jets, energy conversion, solid propellants, heat transfer in rocket engines, and cascade theory. Edse.

852* (863) G 3
Supersonic Combustion
A, W, Sp. 3 cl.
Prereq.: 750.
Hypersonic ramjet, hybrid engines, detonation waves, flame propagation, flame temperature, and combustion kinetics. Edse.

860 (871) G 3
Advanced High Speed Aerodynamics
Su, A, W, Sp. 3 cl.
Prereq.: 761.
Supersonic and hypersonic aerodynamics, unsteady aerodynamics, transonic flows, transient wave phenomena, non-equilibrium gas dynamics. Burggraf, Lee, Li, Nerem, and Von Eschen.

861** (872) G 4
Advanced Boundary Layer and Heat Transfer Theory
Su, A, W, Sp. 4 cl.
Prereq.: 771 and 800; or permission of instructor.
To alternate with 865.
Advanced topics in the areas of boundary layer and heat transfer phenomena. Burggraf, Lee, Li, and Nerem.

865* (776) G 4
Advanced Viscous Flow Theory
Sp. 4 cl.
Prereq.: 771 and 800.
Three-dimensional viscous flow at low and high Reynolds number; stability theory; statistical theories of turbulence. Burggraf, Lee, Li, and Nerem.

868* (777) G 3
Molecular Theory of Gas Flows
Su, A, W, Sp. 3 cl.
Prereq.: 505 and 770, or equiv.
AERONAUTICAL AND ASTRONAUTICAL ENGINEERING

870 (831) G 3
Aerodynamics of Plasmas
Su, A, W, Sp. 3 cl.
Prereq.: 503 and Elec. E. 810 or equiv.
The governing equations of magnetofluidmechanics, similarity laws, and applications to continuum plasma problems of interest in aerodynamics. Petrie.

871 (832) G 3
Aerodynamics of Plasmas
A, W, Sp. 3 cl.
Prereq.: 503.

876* (789) G 4
Hypersonic Flows II
Sp. 4 cl.
Prereq.: 771, 775, and permission of instructor.
Introduction to the study of real gas effects in hypersonics. Lee and Li.

880 (881) G 1
Seminar
Su, A, W, Sp. 1 2-hr. cl.
Repeatable to a maximum of 15 cr. hrs. Reqtd. of all grad. students in Aero-Astro. E. each qtr.

889 G 2-5
Advanced Topics in Aeronautical and Astronautical Engineering
Prereq.: Permission of dept.
Repeatable to a maximum of 15 cr. hrs.

999 (950) G Arr.
Research in Aeronautical and Astronautical Engineering
Research for thesis or dissertation purposes only.

Agricultural Economics

Office: 103 Agricultural Administration Building, 2120 Fyffe Road

Professors Boyne (Chairman), McCormick (Associate Chairman), Bailey, R. H. Baker, R. L. Baker, Barr, Baumer, Cravens, Dambach, Douglas, Ezzell, Hadley, Jacobson, Jones, Milner, Mitchell, Oyler, Sharp, Shaudys, Sherman, Sitterley, Smith, Stout, Tompkin, Walker, Wayt, and Williams; Associate Professors Adams, Batum, Darrow, Himos, Ingraham, Maroon, McDonald, Moore, Phillips, Rask, Steele, and Wessel; Assistant Professors Bowen, Eyring, Hahn, Hushak, Lee, Simonds, Thomas, Tongate, and VandeMark; Instructors Pierce, Pugh, Tucker, and Watkins.

100 (420) U 5
Economic Development of Food and Agriculture
A, W, Sp. 5 cl.
An introduction to agricultural economics; a study of the major economic trends such as production, consumption, marketing, prices and the economics underlying these trends. Boysen, Himes, Hahn, Thomas, Simonds, Darrow, and Eyring.

H199 U 5
Agricultural Economics in a Changing World
Sp. 5 cl.
Prereq.: Membership in a College honors program or eligibility for membership with permission of instructor.
A study of basic economic principles as applied to agricultural production, consumption, and marketing problems in a changing world. Himes, Jones, and McCormick, and Thomas.

GENERAL PREREQUISITES FOR COURSES NUMBERED 300 AND 400

Unless otherwise indicated, the prerequisites for 300 and 400-level courses are 90 cr. hrs. in college courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-399.

410 (502) U 5
Farm Management
A, W, Sp. 5 cl.
Prereq.: 100 and Econ. 201 or 402.
Organization and operation of farm business; economic and management principles involved in decision making, farm planning, enterprise selection, financing, and tenure. Baker, Shaudys, Sitterley, and Eyring.

411 U 5
Farm Management for Developing Countries
Sp. 3 2-hr. lec.-lab. clns.
Prereq.: 100, Econ. 201 or 402, and one course each in Agron. and Animal Sc.
Not open to students with credit for 410.
Economics and management principles in decision making, planning, enterprise selection, organization, financing, and tenure for farming operations in developing countries. Rask.

412 (510) U 5
Farm Records and Analysis
A, W. 2-3 hr. cl.
Prereq.: 100 and Econ. 201 or 402.
Nature and need for farm business records and analysis and interpretation of essential records from farm manager viewpoint; their use in income tax reporting. Baker and Shaudys.

420 (613) U 5
Marketing Farm Products
A, W, Sp. 5 cl.
Prereq.: 100 and Econ. 201 or 402.
Study of local wholesale and retail marketing agencies and principles involved in the marketing of farm products. Cravens, Hahn, Sherman, Stout, Steele, Sharp, and R. L. Baker.

GENERAL PREREQUISITES FOR COURSES NUMBERED 500

Unless otherwise indicated, the prerequisites for 500-level courses are 15 cr. hrs. in courses in the same discipline numbered 200 or higher, or 10 cr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 200 or higher in specified allied disciplines; or baccalaureate degree.

502 (612) U G 3
Prices of Farm Products
W, Sp. 3 cl.
Characteristics of agricultural price, movement, measurement, seasonality, cycles, and forecasting, including analysis of price formation, elasticity, parity, and other price statistics. Himes and Hushak.
516 (610) U G 5
Agricultural Finance
Su, A, Sp. 5 cl. 1 Sat. and 1 overnight field trip.
Prereq.: 410.
Agricultural credit, facilities, procurement, extension, and management. Bailey, Darrow, and Lee.

518 (618) U G 3
Farm Appraisal
Sp. 3 cl. 3-3 hr. field trips during qtr.
Prereq.: 410.
Farm real estate appraisal with emphasis on methods, procedure, and reporting; factors influencing land value and fluctuation in land prices. Baker.

521† (621) U G 5
Poultry Marketing
A. 5 cl.
Prereq.: 420.
(Ofers in cooperation with the Dept. of Poul. Sc.)
Factors affecting supply and demand for poultry products; organization to achieve technical and economic efficiency within and among industry segments. R. L. Baker.

522 (608) U G 3
Livestock Marketing
Su, W. 3 cl.
Prereq.: 420.
(Ofers in cooperation with the Dept. of Animal Sc.)
Selling methods, basis of sale, agencies involved, organization of markets, transportation, financing, marketing costs, prices, when to market, grade differentials, government regulation. Stout and Thomas.

523 (633) U G 3
Grain Marketing
A. 3 cl.
Prereq.: 420.
Principles and practices involved in grain and feed marketing and the theory of grain pricing; economics of grain marketing. Sharp and Milner.

526 (626) U G 3
Marketing Dairy Products
W. 3 cl.
Prereq.: 420.
(Ofers in cooperation with the Depts. of Dairy Sc. and Dairy Tech.)
A study of the principles of assembling, transporting, selling, pricing, distribution, marketing costs, and margin for dairy products. Hahn and Jacobson.

528 (628) U G 3
Marketing Fruits and Vegetables
Sp. 3 cl. 1 2-day field trip.
Prereq.: 420.
Principles involved in the marketing of fruits and vegetables and the agencies concerned. Cravens.

530 (605) U G 5
Agricultural Policy
A, W. 5 cl.
Not open to Juniors.
Characteristics and problems of agriculture; description and analysis of programs and policies designed to assist agriculture and alternative proposals for the future. McCormick and Williams.

531 (615) U G 3
Land Economics
W, Sp. 3 cl.
Land resources and requirements; economic principles involved in land use; major land use problems; ways of achieving better land use; public's interest in land policy. Sitterley and Wayt.

532 (650) U G 3
Foreign Agricultural Development
A. 3 cl.
Analysis of agricultural organization, production, and marketing in foreign countries; foreign agricultural policies and international competition; appraisal of foreign technical assistance programs in agriculture. Adams and Sitterley.

534 (616) U G 3
Food Economics
Sp. 3 cl.
Economic aspects of the production, distribution, and consumption of foods. Simonds.

H539 U G 5
U.S. Agricultural Price and Income Policy
Sp. 5 cl.
Prereq.: Jr. standing and membership in a College honors program or eligibility for membership with permission of instructor.
Not open to students with credit for 538.
A description, analysis, and evaluation of the United States agricultural price and income programs past, present, and proposals for the future. McCormick.

540 (614) U G 5
Business Management in Agricultural Marketing
A, Sp. 5 cl.
Prereq.: 420.
A detailed study of representative agricultural marketing agencies including their problems of administration, employees, financial statements, selling, purchasing, and warehousing. Ingham.

541 (603) U G 5
Cooperation in Agriculture
A, Sp. 5 cl.
Prereq.: 420.
Basic principles of cooperatives including types of organizations, legal aspects, membership relations, financing, organizational and intercooperative problems, and distribution of savings. Ingham.

593 (701) U G 2-5
Individual Studies
H903 (honors) may be available to students enrolled in a college honors program or eligible for enrollment. Repeatable to a maximum of 8 cr. hrs.
Planning, conducting, and reporting a special problem in agricultural economics to meet the needs of the student.

594 (701) U G 1
Group Studies
Repeatable to a maximum of 2 cr. hrs.
Reporting of selected topics in agricultural economics to further acquaint the student with current conditions.
GENERAL PREREQUISITES FOR COURSES NUMBERED 600

Unless otherwise indicated, the prerequisites for 600-level courses are 15 cr. hrs. in courses in the same discipline numbered 500 or higher, or 10 cr. hrs. in courses numbered 500 or higher in the same discipline, plus specified allied disciplines.

610 (502) U G 5
Farm Organization
Su. A. 4 cl., 1 2-hr. lab. and 1 field trip during qtr.
Prereq.: 210, 212, Animal Sc. 300, and Agron. 411 or 412.
Detailed application of production economics, management principles, and decision making techniques to the organization, operation, and administration of farms; farm plans developed.
Shau dys and Sitterley.

620 (713) U G 4
Market Organization in Agricultural Industries
Sp. 4 cl.
Prereq.: 420, 541, and 521 or 522 or 523 or 526 or 528.
Analysis of agricultural market structure, behavior, and performance; interpretation of recent changes in agricultural market structure. Baumer.

632 U G 3
Economic Techniques for Foreign Agricultural Development
Su., W. 3 cl.
Prereq.: 522.
The role of agriculture in economic development, characteristics of traditional agriculture, and the techniques used to modernize agriculture. Adams.

633 U G 3
Economic Development of Latin American Agriculture
Sp. 3 cl.
Analysis of agricultural land, labor, and capital utilization in Latin America; current techniques in land reform, credit, farm organizations, and marketing. Adams.

693 U G 2-5
Individual Studies
H693 (honors) may be available to students enrolled in a college honors program or eligible for enrollment. Repeatable to a maximum of 8 cr. hrs.
Planning, conducting, and reporting a special problem in agricultural economics.

694 U G 2-4
Group Studies
Repeatable to a maximum of 8 cr. hrs.
Selected topics in agricultural economics to acquaint students with current economic conditions.

695 U G 3
Seminar in Agricultural Business Management
A. 3 cl.
Application of business management concepts to agriculture. ingraham.

GENERAL PREREQUISITES FOR COURSES NUMBERED 700

Unless otherwise indicated, the prerequisites for 700-level courses are 15 cr. hrs. in courses in the same discipline numbered 600 or higher, plus additional specified course(s) numbered 600 or higher.

716 U G 3
Agricultural Finance
Sp. 3 cl.
Prereq.: 516 and Bus. Admin. 620.
Analysis of capital budgeting and cash flow techniques as related to agricultural finance; evaluation of selected procedures for estimating the repayment capacity. Bailey and Lee.

740 (711) U G 4
Food Distribution
Sp. 4 cl.
Prereq.: 420 and 540.
Competitive characteristics and trends in food distribution; competitive strategy and management problems in food retailing. Marion.

GENERAL PREREQUISITES FOR COURSES NUMBERED 800 AND 900

Unless otherwise indicated, the prerequisites for 800- and 900-level courses are 30 cr. hrs. in courses in the same discipline, or 20 cr. hrs. in the same discipline, plus 25 cr. hrs. in specified allied disciplines.

800 (811) G 3
Research Methods in Agricultural Economics
Sp. 3 cl.
Prereq.: Econ. 805, 5 cr. hrs. Math., and 4 cr. hrs. statistics.

801 (900 i) G 3
Seminar in Problems in Agricultural Economics Statistics
A. 3 cl.
Prereq.: Econ. 641.
Application of statistics to problems in agricultural economics. Walker.

802 G 3
Quantitative Methods in Agricultural Economics
W. 3 cl.
Prereq.: 800, Econ. 641, and differential calculus.
Applications of analytical models to problems in agricultural economics research. Walker.

803 G 2
Seminar in Linear Programming
Sp. 2 cl.
Prereq.: 800.
Application of linear programming to agriculture. R. H. Baker.

804† G 3
Seminar in Agricultural Price Analysis
Sp. 3 cl.
Prereq.: 800.
Intensive consideration given to theory and analysis of agricultural prices. Himes.
<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Description</th>
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| 805    | (820)   | G 3 Economics of Agricultural Production  
Prereq.: Econ. 805 and 1 course in differential calculus.  
A critical consideration of economic principles as they apply to production problems in agriculture. Moshak and Walker. |
| 806    | (821)   | G 3 Economics of Agricultural Production  
Sp. 3 cl.  
Prereq.: 805.  
A further consideration of economic principles as they apply to production problems in agriculture. Walker and Moshak. |
| 807    | (900 B) | G 2-4 Seminar in Agricultural Economic Theory  
Sp.  
Prereq.: 800, 805, and permission of instructor.  
Repeatable to a maximum of 8 cr. hrs. |
| 810    | (830)   | G 3 Farm Organization and Resource Management  
W. 3 cl.  
Prereq.: 610.  
Designed to integrate resource use and the human factor under dynamic conditions of risk and uncertainty with a goal of economic progress. Shaudys and Sitterley, Resk, and Erven. |
| 811†   |         | G 2-4 Seminar in Farm Organization and Management  
W.  
Application of micro-theory to farm organization and management. |
| 816    |         | G 2-4 Seminar in Agricultural Finance  
A.  
Repeatable to a maximum of 8 cr. hrs.  
Intensive consideration is given to current theories and future problems in agricultural finance. Bailey and Lee. |
| 820    | (840)   | G 3 Agricultural Marketing  
W. 3 cl.  
Prereq.: 620. Econ. 805, and 806.  
Study of the major problems in agricultural marketing and relevant research findings. Sharp, Cravens, Hahn, Stout, Steele, and R. L. Baker. |
| 821    |         | G 2-4 Seminar in Agricultural Marketing  
A.  
Repeatable to a maximum of 8 cr. hrs.  
Critical analysis of major problems in agricultural marketing. |
| 830    | (860)   | G 4 Agricultural Policy  
A. 4 cl.  
Prereq.: 420, 530, Econ. 805, and 806.  
Examination of values of American society concerning agriculture, reasons for these values, and alternatives for achieving various goals for U.S. agriculture. Williams. |
| 831    | (850)   | G 3 Land Economics  
Sp. 3 cl.  
Prereq.: 531 and 805.  
Examination of current problems in land resources use, allocation, conservation, and control. Wayt. |
| 832    | (900 J) | G 2-4 Seminar in Economic Development of Foreign Agriculture  
Sp.  
Prereq.: 632  
Repeatable to a maximum of 8 cr. hrs.  
Characteristic problems of developing countries, identification and analysis of limiting factors in underdevelopment, and techniques for stimulating economic development through growth in agriculture. Adams. |
| 833    | (900 D) | G 2-4 Seminar in Land Tenure, Agrarian Reform, and Agricultural Development  
A.  
Repeatable to a maximum of 8 cr. hrs.  
Evaluation of land reform, agrarian reform, and land tenure systems; emphasis on parcelization, colonization, parcel consolidation, and taxation. |
| 834†   | (900 D) | G 2-4 Seminar in Food Economics  
A.  
An examination of the economic relationship of food production to population and region of the world and areas within countries. Sherman. |
| 887    |         | G 1 Interdepartmental Seminar in Natural Resources  
A. W. Sp.  
(See under Interdepartmental Seminars.) |
| 889    |         | G 1-5 Interdepartmental Seminars  
A. W. Sp.  
(See under Interdepartmental Seminars.) |
| 993    | (701)   | G 2-5 Individual Studies  
Repeatable to a maximum of 10 cr. hrs.  
Planning, conducting, and reporting a special problem in agricultural economics fitting the needs of the student under the guidance of an instructor. |
| 995    | (900)   | G 2 or 4 Seminar  
A. W, Sp.  
Repeatable to a maximum of 10 cr. hrs. |
| 999    | (950)   | G Arr. Research in Agricultural Economics  
Research for thesis or dissertation purposes only. |
Agricultural Education

Office: 208 Agricultural Administration Building, 2120 Fyfe Road.

Professors Bender (Chairman), Hallerman, McCormick, Ritchie, Taylor, Warmbrod, Wilson, Wolf, and Woodin; Associate Professors Boucher, Cunningham, Guiler, Hull, and Schroeder; Assistant Professors Geyer, Jenkins, Lifer, Magisos, Robinson, and Starling; Instructors Archer, Pulse, Walliser, and Young.

GENERAL PREREQUISITES FOR COURSES NUMBERED 200

Unless otherwise indicated, the prerequisites for 200-level courses are 45 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-199.

200 (455) U 3
Introduction to Agricultural Education
A, W, Sp. 3 cr.
The importance and purpose of education in agriculture with emphasis upon nature of programs, opportunities available, and qualifications of personnel. Boucher.

230 (501) U 5
Methods in Teaching Vocational Agriculture
A, W, Sp. 4 cr., 4 lab. hrs.
Prereq.: 203.
The learning process and its application to teaching vocational agriculture with laboratory study in selected schools. Wolf. Fee.

GENERAL PREREQUISITES FOR COURSES NUMBERED 300 AND 400

Unless otherwise indicated, the prerequisites for 300 and 400-level courses are 90 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-399.

380 (550) U 2 or 3
Agricultural Education Experience
Prereq.: 200.
Repeatable to a maximum of 10 cr. hrs. Supervised field experience in:
380.01 Teaching of Agriculture
A (During Sept.), W, Sp.
Wilson.
380.02 Cooperative Extension
Jenkins.
380.03 Specially Programmed Field Work

420 (526) U 3
Extension Program Development
Sp. 3 cr.
Prereq.: 200.
Principles and procedures in developing extension programs in agriculture and home economics, with emphasis on program determination, teaching methods, and relationships with other groups. Jenkins.

GENERAL PREREQUISITES FOR COURSES NUMBERED 500

Unless otherwise indicated, the prerequisites for 500-level courses are 15 cr. hrs. in courses in the same discipline numbered 200 or higher, or 10 cr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 200 or higher in specified allied disciplines; or baccalaureate degree.

531 (504) U 5
Student Teaching in Agriculture
Prereq.: 230 and completion of departmental requirements for admission to the professional program; concur. 582 and 583.
Supervised participation in the professional responsibilities of the teacher in agriculture. Wilson.

582 (505) U 5
Student Teaching in Agriculture
Concur.: 581 and 583.
Supervised participation in the professional responsibilities of the teacher in agriculture. Wilson and Lifer.

583 (506) U 5
Student Teaching in Agriculture
Concur.: 581 and 582.
Supervised participation in the professional responsibilities of the teacher in agriculture. Jenkins.

GENERAL PREREQUISITES FOR COURSES NUMBERED 600

Unless otherwise indicated, the prerequisites for 600-level courses are 15 cr. hrs. in courses in the same discipline numbered 300 or higher, or 10 cr. hrs. in courses numbered 300 or higher in the same discipline; plus 10 cr. hrs. in courses numbered 300 or higher in specified allied disciplines.

621 (707) U G 3
Curriculum Development
Su (1st term), 3 2-kr. cr.
Prereq.: 581, 582, and 583.
Principles and practices used in developing courses of study in agriculture for high school and post-high school programs. Guiler.

622 (715) U G 3
Continuing Education in Agriculture
A. 1 3-kr. cr.
Prereq.: 581, 582, and 583.
Principles and practices involved in developing vocational and technical programs in agriculture for out-of-school youths and adults. Bender and Wolf.

631 (703) U G 3
Methods in Teaching Agriculture
Su (1st term), W. 2 12-kr. cr.
Prereq.: 581, 582, and 583.
Theory, principles, and procedures associated with effective instruction in agriculture at the secondary school and college level. Bender.
AGRICULTURAL EDUCATION

640 (611) U G 3
Teaching Materials for Agricultural Education
Su, Sp. 1 3-hr. cl.
Prereq.: 581, 582, and 583.

641 (705) U G 3
Occupational Experience in Agriculture
Su, A. 1 3-hr. cl.
Prereq.: 581, 582, and 583.
Principles and procedures used by teachers in selecting, planning, conducting, and evaluating occupational experience programs for students in agriculture. Woodin and Wolf.

642 (712) U G 3
Youth Organizations in Agriculture
Sp. 1 3-hr. cl.
Prereq.: 581, 582, and 583.
An analysis of the relationship of youth organizations to educational programs for youth, with emphasis upon planning and conducting FFA and 4-H Club programs. Bender and Boucher.

684 (624) (625) (626) U G 3 or 5
Internship in Agricultural Education
Prereq.: 581, 582, and 583.
Repeatable to a maximum of 10 cr. hrs.
Guided participation in planning, administering, conducting, and evaluating programs in vocational agriculture, agricultural extension, or other fields of vocational education to further enhance professional competence. Guiler.

693 (701) U G 2 or 3
Individual Studies
H693 (honors) may be available to students enrolled in a college honors program or eligible for enrollment.
Planning, conducting, and reporting a special study in agricultural education appropriate to the needs of the student.

GENERAL PREREQUISITES FOR COURSES
NUMBERED 700
Unless otherwise indicated, the prerequisites for 700-level courses are 3 cr. hrs. in courses in the same discipline numbered 400 or higher, plus additional specified course(s) numbered 600 or higher.

743 (708) U G 3
Practicum in Teaching Agricultural Mechanics
W. 1 4-hr. cl.
Prereq.: 621, 631, or 684.
Selection and use of subject matter, resources, and methods of teaching agricultural mechanics. Johnson.

744 (709) U G 3
Practicum in Teaching Farm Business Planning
A. 1 3-hr. cl.
Prereq.: 621, 631, or 684.
Selection and use of subject matter, resources, and methods of teaching farm business planning. Starling.

770 (797) U G 3
Evaluation in Agricultural Education
Sp. 1 3-hr. cl.
Prereq.: 621, 631, or 684.
Principles and procedures of evaluation used in developing programs of agricultural education. Woodin.

780 (799) U G 3-5
Workshops in Agricultural Education
Minimum of 3 wks.
Prereq.: Teaching or extension experience and permission of instructor.
A maximum of 10 cr. hrs. may be earned in any one decimal subdivision; or 15 cr. hrs. in any combination of decimal subdivisions.
Intensive study of selected areas of agricultural education with emphasis on the application of principles and methods in attaining desired objectives.

790.10 General
Su.
790.11 Agricultural Production
Su.
790.12 Agricultural Business, Supplies, and Services
Su.
790.13 Agricultural Equipment and Mechanics
Su.
790.14 Agricultural Products and Processing
Su.
790.15 Ornamental Horticulture
Su.
790.16 Agricultural Resource Conservation
Su.
790.17 Forestry
Su.
790.20 Coordinating Teachers
Su.
790.21 Supervisors
Su.
790.22 Technical School Instructors
Su.
790.23 Continuing Education Teachers
Su.
790.24 Teachers with Special Certificates
Su.
790.25 Teachers of Disadvantaged Youth
Su.

794 U G 3 or 5
Group Studies
A, W, Sp. 1 3-hr. cl.
Prereq.: Teaching or extension experience. Repeatable to a maximum of 10 cr. hrs.
An intensive study of a selected area in agricultural education appropriate to the needs of the group not provided in other courses. Cunningham.

795 (810) U G 1-3
Seminar
Su, A, W, Sp. 1- or 2-hr. cl.
Prereq.: Permission of instructor.
795.01 Contemporary Programs
A.
795.02 Problems and Issues
W.
795.03 Leadership Development
A, Sp.
795.04 Program Development
A.
795.05 Research and Evaluation
A, W.
795.06 Communication
Sp.

GENERAL PREREQUISITES FOR COURSES
NUMBERED 800 AND 900
Unless otherwise indicated, the prerequisites for 800 and 900-level courses are 30 cr. hrs. in courses in the
same discipline, or 20 cr. hrs. in the same discipline, plus 25 cr. hrs. in specified allied disciplines.

810 G 3
Principles of Vocational-Technical Education
A, 1 3-hr. cl.
Prereq.: Professional experience in vocational
education.
An analysis of evolving concepts of vocational and
technical education with emphasis upon principles
underlying organization and practice. Woodin.

811 (804) G 3
Administration and Supervision
in Agricultural Education
A, Sp. 1 3-hr. cl.
Prereq.: Experience in Agr. Ed.
Principles in developing and administering programs
of agricultural education with attention to
federal-state-local relationships, in-service education,
and supervisory procedures. McCormick and Taylor.

812 (806) G 3
Teacher Education for Agriculture
Su (1st term). 5 cl.
Prereq.: Experience in Agr. Ed.
Principles and methods of teacher education in
agriculture including selection and guidance of
students, curriculum, field experience, placement,
in-service education, and research. Wilson.

823 (801) G 3
Program Planning and Development
Su (1st term), W. 1 3-hr. cl.
Prereq.: Experience in Agr. Ed.
Principles, theory, and practice in developing state and
local programs of agricultural education. Cunningham,
Taylor, and Woodin.

855 (850) G 3
Research Methods in Agricultural Education
Su (1st term). 5 cl., W. 1 3-hr. cl.
Prereq.: 6 cr. hrs. grad. courses.
Principles and techniques appropriate for planning,
designing, conducting, and reporting research.
Warmbrod.

886 G 3
Research Design
Sp. 2 3½-hr. cl.
Prereq.: 885 and a course in Statistics.
Development of effective design for research problems
in vocational, technical, and extension education,
including theory, models, sampling, and statistical
analysis. Warmbrod.

899 (835) G 3
Advanced Studies
Prereq.: 886.
Individual field study in partial fulfillment of needs for
research experience.

899 G 2 or 3
Interdepartmental Seminar
W, Sp. 1 or 2 cl.
Investigation and analysis of current problems and
issues in cooperation with other appropriate
departments.

995 G 1-3
Seminar in Research
Su. 1 3-hr. cl.
Prereq.: 886.
Repeatable to a maximum of 3 cr. hrs.
Management and direction of individual research
problems in agricultural and extension education and
the development of programs of research. Cunningham
and Warmbrod.

999 (950) G Arr.
Research in Agricultural Education
Research for thesis or dissertation purposes only.

Agricultural Engineering

Office: 105 Ives Hall, 2073 Neil Avenue

Professors Nelson (Chairman), Barre, Blickle,
Bondurant, Brazee, Curry, Harrold, Huber, C. E.
Johnson, W. H. Johnson, Rollin, Schwab, Stuckey, and
Taigamides; Associate Professors Byg, Drew, Gill,
Hamdy, Herum, Miller, Palmer, and Reese; Assistant
Professors Blaisdell, Fox, Henry, Schnug, Short, and
White; Instructors Brit, Fausey, Fouss, Harkness,
Keener, Nolte, Norman, and Walker.

GENERAL PREREQUISITES FOR COURSES
NUMBERED 200
Unless otherwise indicated, the prerequisites for
200-level courses are 45 cr. hrs. in collegiate courses,
exclusive of ROTC and Phys. Ed.; or specified course(s)
numbered 100-199.

220 (522) U 3
Buildings and Equipment
for Farmstead Operations
A, 2 cl., 2 lab. hrs.
Prereq.: Math. 117, 121, or 130.
Functional requirements and planning of buildings
and facilities for livestock production and for
conditioning and storage of crops; environmental
control; building construction. Barre.
Agricultural Materials Handling Systems
W. 2 cl., 2 lab. hrs.
Prereq: Math. 117, 121, or 150.
Principles, functional analysis and design of agricultural materials handling systems from harvest to utilization. Herkness.

Introduction to Agricultural Engineering Design
A. 2 3-hr. lab.
Prereq: Physics 132.
Open only to Agr. E. majors.
Principles of engineering design, emphasizing biological concepts of importance in agricultural production and processing. Harkness.

Power for Agricultural Operations
A, W, Sp. 2 cl., 2 lab. hrs.
Prereq: Math. 117, 121, or 150.
A study of power in agriculture with primary emphasis upon power needs for field operations, characteristics of available power sources, selection, and use of power units. Huber.

Electric Power for Agricultural Operations
W. 2 cl., 2 lab. hrs.
Prereq: Math. 117, 121, or 150.
Functional analysis of systems and components essential for distribution and control of electricity for power, heat, and illumination applications in agriculture. Harkness. Fee.

Teaching of Agricultural Construction and Maintenance
A, W, Sp. 2 cl., 6 lab. hrs.
Prereq, or concur.: Agr. Ed. 230.
Principles and methods of teaching selection, use, and care of hand and power tools, materials for wood and metal construction based upon farm needs. C. Johnson. Fee.

Machines for Agricultural Operations
A, Sp. 2 cl., 2 lab. hrs.
Prereq.: Math. 117, 121, or 150.
Analysis of field machine operations with emphasis on recognition and quantitative solution of problems in selection and use of machines for optimum economic performance. Harkness.

Agricultural Drainage and Erosion Control
A, Sp. 2 cl., 3 lab. hrs.
Prereq.: Math. 117, 121, or 150, and Agron. 240.
Use and application of surveying instruments, aerial and topographic maps, rainfall and runoff, and engineering problems of soil and water management on farms. Schwab and Teiganides.

GENERAL PREREQUISITES FOR COURSES NUMBERED 300 AND 400
Unless otherwise indicated, the prerequisites for 300 and 400-level courses are 50 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed., or specified course(s) numbered 100-399.

Fundamentals of Food Engineering
A. 3 cl., 2 2-hr. lab.
Prereq.: 10 cr. hrs. in Math., 10 cr. hrs. in Chem. and 5 cr. hrs. in Physics.
(Offered in cooperation with the Dept. of Dairy Tech.)
Introduction to heat transfer, fluid flow, and thermodynamics in food processes. Blaisdell. Fee.

Refrigeration Engineering in the Food Industry
Sp. 3 cl., 2 2-hr. lab.
Prereq.: 310.
(Offered in cooperation with the Dept of Dairy Tech.)
Transient heat transfer, thermodynamics of refrigeration systems, and applications of refrigeration in food processing. Blaisdell. Fee.

Engineering Properties of Biological Materials
Sp. 2 cl., 1 2-hr. lab.
Identification and measurement of the physical properties of agricultural materials relevant to the engineering of systems for their production, harvesting, handling, and classification. Blaisdell and Herkness. Fee.

Analysis of Elementary Biological-Physical Systems
A. 3 cl.
Mathematical model formulation and analysis techniques developed and applied to elementary biological and physical systems in agricultural production and processing. Hamdy.

Biometeorology of Plant and Animal Systems
W. 3 cl.
Prereq.: 433.
Study of the micro- and macro-environmental variables in nature as they relate to the engineering of plant and animal production systems. Schwab.

GENERAL PREREQUISITES FOR COURSES NUMBERED 500
Unless otherwise indicated, the prerequisites for 500-level courses are 15 cr. hrs. in courses in the same discipline numbered 200 or higher, or 10 cr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 200 or higher in specified allied disciplines; or baccalaureate degree.

Farm and Home Safety
Sp. 1 cl.
Course: accidents; methods for conducting farm and home safety programs; for students interested in vocational agriculture, extension, and farm organization work.
535 UG 4
Utilization of Energy in Agriculture
Sp. 3 cl., 1 2-hr. lab.
Study of motive and stationary power needs of agriculture, mechanics of traction, characteristics of power sources, morphology of off-the-road vehicle design. Huber.

533 UG 5
Engineering Soil-Water Management
A. 3 cl., 2 3-hr. lab.
Prereq.: 434, Agron. 671, and Civil E. 511; or equiv.
Engineering design of drainage, irrigation, and erosion control systems for optimum crop growth, environment, and related water storage structures. Schwab.

544 UG 4
Engineering Agricultural Machines
A. 3 cl., 1 3-hr. lab.
Design of agricultural machines; recognition of the economic, political, and social context in which the machinery is designed, built, distributed, and used.

551 (605) UG 3
Advanced Farm Power and Field Machinery
Su (1st term). 3 cl., 2 2-hr. lab.
Prereq.: 10 cr. hrs. Agr. E., 8 cr. hrs. Agron., or baccalaureate degree.
An advanced study of harvesting machines and power units from the mechanical, operational, and economic standpoint; emphasis is given to the development of optimum harvest systems.

591 (799) UG 4
Workshop
Su (1st term). First 3 wks.—full time.
Prereq.: 15 cr. hrs. Agr. E. and permission of instructor.
Principles, objectives, methods, and equipment in the organization and management of a program for teaching farm mechanics; students will plan, present, and evaluate units of instruction.
(a) Farm Mechanics. Johnson.

593 (701) UG 3-5
Individual Studies
Hours (honors) may be available to students enrolled in a college honors program or eligible for enrollment.
Prereq.: Permission of instructor.
Advanced study of problems not included in regular courses of this department.

594 UG 3-5
Group Studies
Prereq.: Permission of instructor.
Intensive study of selected areas in agricultural engineering not provided in other courses and appropriate to the needs of the students.

611 UG 5
Food Engineering Design and Control
W. 3 cl., 2 2-hr. lab.
Prereq.: 316, 411, and Animal Sc. 650 or Dairy Tech. 632 or Home Ec. 615 or Hort. 442.
(Granted in cooperation with the Dept. of Dairy Tech.)
Integration of economic principles, food sciences, and engineering in optimum design and control of processing systems. Blaisdell.

645 UG 4
Environmental Engineering of Agricultural Structures
W. 4 cl.
Prereq.: 434.
Functional requirements and principles involved in housing animals and crops; analysis of factors and properties affecting energy exchanges with the environment. Barre.

646 UG 4
Engineering Agricultural Processing Systems
W. 3 cl., 1 3-hr. lab.
Design of systems for processing agricultural food, feed, and fiber, utilizing principles of biodynamics, transient diffusion, turbulent and non-ideal transport, and particulate handling. Blaisdell and Herum. Fee.

647 UG 4
Engineering Agricultural Systems
Sp. 2 cl., 2 2-hr. lab.
Prereq.: 543, 544, 645, 646, and Genetics 650; or equiv.
Integration of engineering and biological principles in agriculture to optimize complete operational production systems; application of relevant theory to present and future systems. Barre.

681 UG 5
Simulation in Agricultural Engineering
W. 3 cl., 2 2-hr. lab.
Prereq.: Math. 255 and Elec. E. 520, or equiv.
Principles of analog and hybrid simulation developed and applied to engineering problems in agricultural systems. Hamdy.

693 (702) UG 3 or 5
Individual Studies
Prereq.: 15 cr. hrs. of 500-level or higher Agr. E. courses and permission of instructor.
Repeatable to a maximum of 30 cr. hrs.
Work on problems that are not included in regular courses; practice in development, organization, solution, and report on problems of student's choosing.
694 U G 3-5
Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 10 cr. hrs.
Advanced studies in agricultural engineering with
principal emphasis on design; work may be elected in
the following general areas:
   a. Machinery
   b. Light Structures
   c. Processing
   d. Soil-Water Management

GENERAL PREREQUISITES FOR COURSES
NUMBERED 700
Unless otherwise indicated, the prerequisites for
700-level courses are 15 cr. hrs. in courses in the same
discipline numbered 400 or higher, plus additional
specified course(s) numbered 600 or higher.

794 (798) U G 3
Group Studies
A, Sp. 3 cr.
Prereq.: 15 cr. hrs. of 600 level or higher Agr. E. courses
and permission of instructor.
Repeatable to a maximum of 9 cr. hrs.
Advanced subjects in agricultural engineering; course
content to be announced in previous quarter.
   A. Farm Structures.
   Sp. Power and machinery.

GENERAL PREREQUISITES FOR COURSES
NUMBERED 800 AND 900
Unless otherwise indicated, the prerequisites for 800
and 900-level courses are 30 cr. hrs. in courses in the
same discipline, or 20 cr. hrs. in the same discipline,
plus 25 cr. hrs. in specified allied disciplines.

808* (880) G 3
Measurement in Agricultural Engineering
Su (2nd term). 3 cr.
Prereq.: Math. 550, 557, 704, and Mech. E. 770, 771, or
equiv.
Theory and principles involved in measurement and
control of biophysical processes in agricultural
engineering. Curry.

850 (801) G 1
Seminar
A, W, Sp. 1 cr.
Repeatable to a maximum of 3 cr. hrs.
Schwab.

857* (883) G 3
Soil Machine Dynamics in Plant Environment
Sp. 3 cr.
Mass and heat transfer in soil and dynamics of
mechanical actions on soil in relation to plant
environment and agricultural machine design and use.

858* (885) G 5
Turbulent Diffusion of Aerosols
A. 5 cr.
Prereq.: Math. 704 and permission of instructor.
Phenomenological and statistical turbulent diffusion
theories; cloud displacement and distortion; turbulent
diffusion equations and tensions; fluid flow and
turbulence effects; applications. Brazee.

877* (887) G 3
Advanced Agricultural Drainage
W. 3 cr.
Prereq.: 543 and Math. 412.
Theory of agricultural drainage, both tile and surface
methods; measurements of drainage and frequency
analysis; hydrologic characteristics of drainage
systems; drainage requirements of crops. Schwab.

897 G 1
Interdepartmental Seminar in Natural Resources
(See under Interdepartmental Seminars.)

999 (950) G Arr.
Research
Research for thesis and dissertation purposes only.

Agriculture Survey Courses

101 (401) U 1
Agriculture College Orientation
Su, A, W, Sp. 1 cr.
Not open to students with credit for UVC 100.
Orientation to the University and College; exploration of
curricula, opportunities, and services. Waliser.

GENERAL PREREQUISITES FOR COURSES
NUMBERED 300 AND 400
Unless otherwise indicated, the prerequisites for 300
and 400-level courses are 90 cr. hrs. in collegiate
courses, exclusive of ROTC and Phys. Ed., or specified
course(s) numbered 100-399.

351 (501) U 1
Agricultural Employment
A, W. 1 cr.
Introduction to opportunities in agriculture; discussions
related to employment, interviews, selection, and
application for career positions. Darrow.

H590 (502) U 2
Agriculture Honors Colloquium
W. 2 cr.
Prereq.: Enrollment in Agriculture Honors Program.
Repeatable to a maximum of 4 cr. hrs.
The relationships of technology, science, and economics
in agriculture to society; discussions are led by faculty
members or outside speakers. Ritchie.
Agronomy

Offices: 108 Townshend Hall, 1885 Neil Avenue, 101 Horticulture and Forestry Buildings, 1827 Neil Avenue

Professors Volk (Chairman), Arscott, Bader, Bavay, Clemens, Davis, Dollinger, Findley, Franklin, Friday, Glot, Hagihiri, Himes, Hoff, Hollowaychuk, McLean, Mederski, Musgrave, Parsons, Ray (Assistant Chairman), Ryder, Smith, Taylor, Teater, Triplett, Vandoren, Vankeuren, Wilding, Yamazaki, and Yoder; Associate Professors Bendixen, Clark, Hef, Henderlong, Herr, Layfer, Linville, R. H. Miller, R. W. Miller, Niehaus, B. Schmidt (Associate Chairman, Wooster), Shepherd, Shoemaker, Stroube, Sutton, Vimmerstedt, W. Schmidt, and Waldrum; Assistant Professors Bone, Derickson, Everett, Goettmanceller, Hall, Heizer, Jeffers, Moser, Stahnke, Streeter, and Trierweiler; Instructors Fausage, Myers, and Wilson.

GENERAL PREREQUISITES FOR COURSES NUMERATED 200

Unless otherwise indicated, the prerequisites for 200-level courses are 45 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-199.

200 U 5

Plant Science in Agriculture
Su, A, W, Sp. 5 cl.
Prereq.: Biol. 100.
Not open to students with credit for Agron. (403) or Hort. (402).
(Offered in cooperation with the Dept. of Hort.)
Study of environment and genetic factors that influence plant growth, and how man can alter these factors to produce plants which more adequately meet his needs. Alban, Geisman, Hartman, and Herr.

240 (501) U 5

Soil Science
Su, A, W, Sp. 3 cl., 2 2-hr. lab.
Prereq.: Chem. 101 and 102, or 121 and 122, or equivv.
Introduction to the genetic, physical, chemical, and biological properties influencing soil productivity; laboratory exercises include observation and quantitative determination of certain of these soil properties. Hoff. Fee.

Plants and Man
(See Horticulture H209)
(Offered in cooperation with the Departments of Horticulture and Forestry, and Agronomy.)

GENERAL PREREQUISITES FOR COURSES NUMERATED 300 AND 400

Unless otherwise indicated, the prerequisites for 300 and 400-level courses are 90 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-399.

412 (520) U 4

Forage Crops
A, W, Sp. 3 cl., 1 2-hr. lab.
Prereq.: 200 or junior standing.
Principles underlying characteristics, tolerances, requirements, uses; production of forage plants for hay, pasture, silage, soilage, and cover. Moser.

413 (630) U 4

Principles of Turfgrass Selection and Management
Sp. 4 cl.
Prereq.: 200 or 260.
Adaptation, identification, uses, growth characteristics, growth responses, and fundamental principles essential to the production of quality turf. Miller.

422 (525) U 4

Weed Control
A, Sp. 3 cl., 1 2-hr. lab.
Prereq.: 200.
A study of weeds, their identification, reproduction, and methods of control; emphasis on various aspects of chemical control measures. Hoff.

441 (604) U 4

Soil Erosion and Its Control
A. 3 cl., 1 3-hr. lab.
Prereq.: 240.
A study of the mechanics of soil erosion and its control; field trips to observe erosion and conservation practices are included. Hoff. Fee.

442 (613) U 3

Soil Management
A. 3 cl.
Prereq.: 240.
An integrated study of fertility, tillage erosion control, and water management in maintaining soil productivity. Shoemaker.

GENERAL PREREQUISITES FOR COURSES NUMERATED 500

Unless otherwise indicated, the prerequisites for 500-level courses are 15 cr. hrs. in courses in the same discipline numbered 200 or higher, or 30 cr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 260 or higher in specified allied disciplines; or baccalaureate degree.

510 (600) U G 4

Crop Production in Developing Countries
W. 4 cl.
Prereq.: 200, 240 or equivv.
Fundamental studies of field and plantation crops in tropical and subtropical countries with emphasis on means and techniques for obtaining production increases. Arscott.

530 (614) U G 4

Field Crop Breeding
W. 3 cl., 1 2-hr. lab.
Prereq.: 200, and 411 or 412, and Genetics 314, or equivv.
Principles of genetics and methods of plant breeding applied to the improvement of field crops and the ultimate development of superior varieties. Smith.
Tropical and Subtropical Soils
A. 3 cl.
Prereq.: 15 cr. hrs. of Agron., Hort., Geol., or equiv. at the 200 course level or above.
A study of the physical, chemical, and biological properties and the fertilization, physical, and water management of tropical and subtropical soils; crop adaptation, plantation, and subsistence farming. Hescott.

Pedology and Edaphology
Sp. 3 cl., 1 4-hr. lab. and field trips.
Prereq.: 290, 240, and 442.
A comprehensive study of soil with respect to its components, morphology, and genesis and how morphology influences soil behavior especially as it pertains to Ohio conditions. Hall. Fee.

Field Work
Su. 3-week field trip.
Prereq.: Permission of instructor.
Repeatable to a maximum of 10 cr. hrs.
A field trip to the major crop, soil, and climatic regions east or west of the Mississippi River in the U.S. and to the major industries that utilize crops. Fee.

Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 10 cr. hrs.
Discussion of selected topics in crop science and/or soil science.

Undergraduate Seminar
A, W, Sp. 2 cl.
Prereq.: 15 cr. hrs. in Agron. and 3rd or 4th yr. standing in Agron.
Review and interpretation of research publications and study of functions of agronomic industries.

GENERAL PREREQUISITES FOR COURSES NUMBERED 600
Unless otherwise indicated, the prerequisites for 600-level courses are 15 cr. hrs. in courses in the same discipline numbered 300 or higher, or 10 cr. hrs. in courses numbered 300 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 300 or higher in specified allied disciplines.

Field Crop Ecology
Sp. 3 cl.
Prereq.: 10 cr. hrs. of crops courses and 5 cr. hrs. of soils courses at the 300 level or higher.

Principles of Grassland Management
Sp. 4 cl., 1 4-day field trip.
Plant-animal requirements and correlations in the maintenance, management, and utilization of meadows, pastures, and ranges. Moser. Fee.

Principles of Field Crop Management
A, W. 3 cl.
Prereq.: Bot. 430 and 431, or equiv.
Principles of field crop management and their influence on cultural practices with emphasis on corn, soybeans, and wheat. Henderlong.

Principles of Turfgrass Management
Sp. 4 cl.
Prereq.: 413, Bot. 430 and 431.
A study of the relationship between basic factors influencing turfgrass growth and the practical execution of maintenance practices which affect the production of quality turf. Miller.

Advanced Soil Classification Morphology and Genesis
W. 4 cl., 1 2-hr. lab., 3 1-day field trips.
Prereq.: 550, 10 cr. hrs. from the following: 442, 621, Bot. 620, Geol. 550.
Theory and principles of soil classification schemes emphasizing the 7th Approximation, classification and genesis of major soils of the world; methods to establish parent material homogeneity and indices of soil weathering. Wildung. Fee.

Soil Microbiology
Sp. 3 cl., 2 2-hr. labs.
Prereq.: 441, Microbiol. 607, and Chem. 231 or 532.

Soil Fertility
A. 3 cl.
Prereq.: 441.
A study of the factors affecting soil productivity and the practices needed in good soil management; fertilizer properties and practices. Hescott.

Soil Physics
A. 3 cl., 2 2-hr. labs.
Prereq.: 441, Physics 231, 232, 233, and Math. 152.
A study of the physical makeup and properties of soil, including structure, thermal relationships, consistency, plasticity, water, and their relationships. Bauer. Fee.

Chemistry of Soils and Fertilizers
W. 3 cl., 2 2-hr. labs.
Prereq.: 550, 670, Chem. 211 and 9 additional cr. hrs. in Agron. and/or Chem. at the 300 level or higher.
A study of the chemical properties of soils and fertilizers affecting plant growth and composition including modern laboratory analysis of soil, fertilizer, and plant tissue. McLean.
693  (701)  U G 3 or 5  Individual Studies
11603 (honors) may be available to students enrolled in
a college honors program or eligible for enrollment.
Prereq.: Permission of instructor.
Repeatable to a maximum of 10 cr. hrs.
Students may select special agronomic problems, not
included in regular courses and involving library,
laboratory, or field studies.

GENERAL PREREQUISITES FOR COURSES
NUMBERED 700

Unless otherwise indicated, the prerequisites for
700-level courses are 15 cr. hrs. in courses in the same
discipline numbered 400 or higher, plus additional
specified course(s) numbered 600 or higher.

750*  U G 4  Methods of Soil Mineralogical Investigations
Sp.  2 cl., 2 2-hr. labs.
Prereq.: 15 cr. hrs. selected from the following: 550,
671, 672, Geol. 602, Mineral. 621, 654, Chem. 521, 621,
and 676.
Theory, interpretation, and application of mineralogical
tools for soil matrices including X-ray diffraction, X-ray
spectroscopy, microscopy, thin section and thermal
techniques. Widing. Fee.

786  U G 3  Radioactive Tracers in Plant and
Soil Research
W.  1 cl., 2 3-hr. labs.
Prereq.: 672.
Radiochemical principles and techniques used in soil
and plant research; designed to prepare the student to
can conduct radio-tracer experiments. Franklin. Fee.

GENERAL PREREQUISITES FOR COURSES
NUMBERED 800 AND 900

Unless otherwise indicated, the prerequisites for 800
and 900-level courses are 30 cr. hrs. in courses in the
same discipline, or 20 cr. hrs. in the same discipline,
plus 25 cr. hrs. in specified allied disciplines.

822  (825)  G 5  Physiological and Biochemical
Aspects of Herbicides
W.  4 cl., 1 2-hr. lab.
Herbicide absorption, course, fate, and mode of action
in plants; persistence and fate in soils. Bendixen.

830*  (814)  G 4  Advanced Field Crop Breeding
W.  3 cl., 1 2-hr. lab.
Prereq.: 539, Genetics 650, and 16 additional cr. hrs. in
Agron.
A detailed study of the genetic fundamentals and
modern procedures used in the development of plant
breeding programs for the improvement of agronomic
crops. Ray.

850*  G 3  Soils of the Cold Regions
Sp.  3 cl.
Prereq.: 30 cr. hrs. of Agron. or 30 cr. hrs. of Geog. and
Geol. and Ecology.

A study of the morphological, physical, chemical, and
biological properties of the soils and environmental
features of the polar and alpine regions. Everett.

869*  G 3  Chemistry of Soil Organic Matter
Sp.  3 cl.
Prereq.: 660 and 25 cr. hrs. of Agron., or 20 cr. hrs.
A comprehensive study of soil organic matter including
methods of study, theories of synthesis, physical and
chemical properties, accumulation and functions of
organic matter. Miller.

870*  G 3  Soil-Plant Relationships
Su (1st term).  3 cl.
Prereq.: 20 cr. hrs. of soil and/or plant sciences and 10
cr. hrs. of plant physiology.
Discussion of recent literature pertaining to growth
response curves, nutrient uptake, movement of
nutrients in the soil, and measurement of availability
of nutrients to plants. McLean and Himes.

871*  G 3  Advanced Soil Physics
W.  3 cl.
Prereq.: 671 and permission of instructor.
Moisture, gaseous, and thermal processes and regimes
in vegetated soils and their influences on plant growth.
Taylor.

872  (805)  G 5  Physical Chemistry of Soils
W.  3 cl., 2 3-hr. labs.
Prereq.: 671, 672, Chem. 521 or 532, and 15 additional cr.
hrs. in Agron. or Biol.
A study of the physicochemical properties of soil
including methods of characterizing clay minerals, soil
acidity, cation exchange capacity, cation uptake,
and plant nutrient uptake. McLean.

880  (801)  G 2  Seminar
Repeatable to a maximum of 12 cr. hrs.
Discussion of current problems in agronomy. Bendixen.

885  G 1  Research Principles and Techniques
A.  1 cl.
The philosophy of graduate education and the
description of the techniques and special equipment
most useful for conducting research in crops and soils
science. McLean.

887  (807)  G 5  Techniques of Experimental Design
W.  5 cl.
Prereq.: Genetics 650, 651, and 10 cr. hrs. of Agron., or
related subjects at the 400 level or above.
A study of experimental designs and their application
to agricultural research. Smith.
Air Force Aerospace Studies

Office: 350 ROTC Building, 2121 Tuttle Park Place
Air Force Reserve Officer Training Corps
Colonel Moody and Staff.

General Military Course
(Freshmen and Sophomores)

101 (401) U 2
International Relations and United States Defense
A. 1 cl., 1 lab. hr.
An introduction to the nature and principles of war, the international relationships of nations throughout the spectrum of conflict, and a simplified examination of the United States defense organization.

102 (402) U 2
The Air Force and United States Defense
W. 1 cl., 1 lab. hr.
Prereq.: 101 or permission of Professor of A. F. Aero. S. A continuation of the United States defense organization with emphasis on the United States Air Force; its role, functions, development, and basic doctrine.

103 (403) U 2
United States' Strategic Offensive and Defensive Forces
Sp. 1 cl., 1 lab. hr.
Prereq.: 102 or permission of Professor of A. F. Aero. S. A comprehensive study of our nation's strategic aerospace forces including the Strategic Air Command, North American Air Defense Command and future offensive and defensive problems confronting the United States.

201 (501) U 2
United States' General Purpose Forces
A. 1 cl., 1 lab. hr.
Prereq.: 103 or permission of Professor of A. F. Aero. S. A study of the structure, mission, and operations of United States general purpose forces with emphasis on counterinsurgency operations and the role of the United States Air Force.

202 (502) U 2
Aerospace Support Forces and Major Ideological Conflicts
W. 1 cl., 1 lab. hr.
Prereq.: 201 or permission of Prof. of A. F. Aero. S. A study of the major ideological conflicts of the world with emphasis on American democracy versus international communism, a survey of United States aerospace support forces as they relate to our national objectives.

203 (503) U 2
Collective Security and the Search for Peace
Sp. 1 cl., 1 lab. hr.
Prereq.: 202 or permission of Prof. of A. F. Aero. S. An examination of defense treaties and military alliances and an assessment of the prospects for peace.

PROFESSIONAL OFFICER COURSE
(Juniors, Seniors, and Graduate Students)

301 (601) U 3
History of Aerospace Power
A. 3 cl., 1 lab.
Prereq.: Completion of General Military Course; completion of Air Force ROTC Two-Year Field Training; or permission of Professor of A. F. Aero. S. A study of the history of the Air Force and the growth and development of aerospace power.

302 (602) U 3
Aerospace Power Today and Tomorrow
W. 3 cl., 1 lab.
Prereq.: 301 or permission of Professor of A. F. Aero. S. An investigation of the fundamental concepts and doctrine undergirding aerospace forces; current and future employment of manned aircraft; introduction to aeronautics and space operations.

303 (603) U 3
Astronautics and Space Operations
Sp. 3 cl., 1 lab.
Prereq.: 302 or permission of Professor of A. F. Aero. S. A study of aerospace technology; current and future space operations and their relationship to national security.

401 (705) U 3
Leadership and the Military Justice System
A. 3 cl., 1 lab.
Prereq.: 303 or permission of Professor of A. F. Aero. S. An analysis of the theories and techniques of leadership; study and practical applications of human relations and behavior; and an introduction to the uniform code of military justice.
402 (706) U 3
Leadership and Management of Aerospace Forces
W. 3 cl., 1 lab.
Prereq.: 411 or permission of Prof. of A. F. Aero. S.
A study of the variables affecting leadership and the pre-execution phase of military management: planning, organizing, and coordinating.

403 (707) U 3
Management of Aerospace Forces and Preparation for Active Duty
Sp. 3 cl., 1 lab.
Prereq.: 402 or permission of Prof. of A. F. Aero. S.
A study of the execution phase of military management: directing and controlling, and team and individual presentations which prepare the cadet for active duty as an Air Force Officer.

411 (701) U 1
Weather and Navigation
A, W, Sp. 4 cl., first 4 wks. of qtr.
Prereq.: 303 or permission of Professor of A. F. Aero. S.
Basic principles of weather and navigation; preparation of student to meet Federal Aviation Agency standards for student pilots in Air Force Flight Instruction Program.

Allied Medicine
(School of Allied Medical Professions)
Office: M-118 Starling Loving Hall, 320 West Tenth Avenue
Professor Atwell; Associate Professor Schoen.

101 U 2
Introduction to the Health Professions
A, W. 2 cl.
An examination of the professions involved in health care, with emphasis on those offered in the School of Allied Medical Professions.

520 U 2
Musculoskeletal Disease
Sp. 2 cl.
Prereq.: Admission to the School of Allied Medical Professions or permission of instructor.
Not open to students with credit for Phys. Ther. 520. Principles, clinical aspects, and therapeutic procedures related to diseases of the musculoskeletal system.

530 U 3
Neuromuscular Disease
W. 3 cl.
Prereq.: Anat. 201 or permission of instructor.
Not open to students with credit for Phys. Ther. 530. Survey of injury and disease of the central, peripheral, and autonomic nervous systems; presentation of clinical material.

550 U G 3
Automated Systems in Health Care
Sp. 2 cl., 1 2-hr. lab.
Prereq.: Permission of instructor.
Concepts of electronic data processing and automated systems applied to health care; implications and planning requirements for present and future systems. Casbergue.

591 U P 2
Interdisciplinary Health Care
A, W, Sp. 2 cl.
Prereq.: Enrollment in School of Allied Medical Professions or School of Nursing or permission of instructor.
A focus on the professions that compose the allied health team, including study and evaluation of health trends, social legislation, and current professional issues.

592 U P 2
Interdisciplinary Health Care—Field Study
A, W, Sp. 4 cl., arr.
Prereq.: Enrollment in School of Allied Medical Professions or School of Nursing or permission of instructor.
Selected patient care experiences that will develop the concept of the Health Care Team.

693 U G 1-5
Individual Studies
Su, A, W. 1-5 cl., arr.
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Guided study of selected topics.

695 U G 1-6
Seminar
Su, A, W. 1-3 cl., arr.
Prereq.: Permission of instructor.
Repeatable to a maximum of 9 cr. hrs.
Conferences and group discussions of selected topics.

797 U P G 1-5
Interdepartmental Seminars
Prereq.: Permission of instructor.
Repeatable by permission of Assistant Director of the School.
(See under Interdepartmental Seminars, University Academic Policies and Course Offerings catalog.)

999 G Arr.
Research
Repeatable to a maximum of 6 cr. hrs.
Research for thesis purposes only.
Anatomy

Office: 4072 Medical Basic Science Building, 370 West Ninth Avenue

Professors Graves (Chairman), Ackerman, Baker (Emeritus), Edwards (Emeritus), L. Egilis, J. Egilis, Gaughan, and Palmer; Associate Professors Delphia, Gersten (Emeritus), Martin, Russell, St. Pierre, Vernall, and Wisman; Assistant Professors Boston, Christopher, Clark, D’Costa, Dom, Hayes, Humberton, King, Kontras, Martinek, Navin, Sucheston, and Troiano, While; Instructors Hines, Lauer, Lechnitz and Meiff.

For related courses see Biology and Zoology.

200 (504) U 6
Introductory Anatomy
Su, A. W. Sp.
Prereq.: Enrollment in School of Nursing, Division of Dental Hygiene, School of Allied Medical Professions, College of Pharmacy, or Pre-Pharmacy.
Fundamental principles of human anatomy, supplemented by demonstrations of human material. Weingart.

201 (505) U 5
Neuromuscular Anatomy
A. 2 cl., 2 3-hr. labs.
Prereq.: Enrollment in School of Allied Medical Professions or permission of instructor.
Neuromuscular anatomy of the human body.

627 P G 2
Clinical Anatomy
Sp. 2 cl.
Prereq.: Med. 2nd yr. standing.
A study of selected anatomical regions correlated with clinical diagnostic methods. Graves and Staff.

637 P 3
Essentials of Embryonic Development
A. 2 cl., 1 3-hr. lab.
Prereq.: Dent. 1st yr. standing.
The early embryology and organogenesis of man; emphasizing the pig embryo supplemented by human material. Delphia.

638 P G 5
Human Anatomy
W, Sp. 3 cl., 2 3-hr. lab.
Prereq.: Dent. 1st yr. standing.
Gross anatomy of the abdomen and extremities. I. Egilis.

639 P G 7
Human Anatomy
W, Sp. 4 cl., 3 3-hr. lab.
Prereq.: Dent. 1st yr. standing.
Gross anatomy of the head, neck, and thorax. Russell, Boston, and Lauer.

640 P G 6
Histology
A. 3 cl., 3 3-hr. lab.
Prereq.: Dent. 1st yr. standing.
General histology of the tissues and special histology of the organ systems. Vernall, J. Egilis, and Hayes.

641 P G 1
Applied Anatomy
A. 1 cl.
Prereq.: Dent. 3rd yr. standing.
Anatomy of the head and neck as applied to clinical dentistry. Russell.

651 P G 2
Human Developmental Anatomy and Genetics I
A. 26 cl. and lab. hrs.
Prereq.: Med. 1st yr. standing or permission of instructor.
Not open to students with credit for 615 or 815.
Emphasis is on human gametogenesis, fertilization, and the formation of germ layers, fetal membranes, and organs.

652 P G 1
Human Developmental Anatomy and Genetics II
W. 13 cl. and lab. hrs.
Prereq.: Med. 1st yr. standing and 651, or permission of instructor.
Not open to students with credit for 617 or 815.
Continuation of 651.

653 P G 1
Human Developmental Anatomy and Genetics III
Sp. 13 cl. and lab. hrs.
Prereq.: Med. 1st yr. standing, 651 and 652. or permission of instructor.
Not open to students with credit for 615 and 617 or 815.
Continuation of 652.

661 P G 4
Human Anatomy I
A. 78 cl. and lab. hrs.
Prereq.: Med. 1st yr. standing or permission of instructor.
Not open to students with credit for 621 or 821.
Gross anatomy of the human body using cadavers, roentgenograms, cross sections, models, and films; physical diagnosis, television demonstrations, and individual clinical observation.

662 P G 4
Human Anatomy II
W. 78 cl. and lab. hrs.
Prereq.: Med. 1st yr. standing and 661, or permission of instructor.
Not open to students with credit for 621, 622, or 822.
Continuation of 661.

663 P G 4
Human Anatomy III
Sp. 78 cl. and lab. hrs.
Prereq.: Med. 1st yr. standing, 661 and 662, or permission of instructor.
Not open to students with credit for 622 or 821 and 822.
Continuation of 662.
Human Histology I
A. 56 cl. and lab. hrs.
Prereq.: Med. 1st yr. standing or permission of instructor.
Not open to students with credit for 624 or 824.
A study of the cells and tissues of the human body.

Human Histology II
W. 28 cl. and lab. hrs.
Prereq.: Med. 1st yr. standing and 671, or permission of instructor.
Not open to students with credit for 625 or 825.
Continuation of 671.

Human Histology III
Sp. 56 cl. and lab. hrs.
Prereq.: Med. 1st yr. standing, 672, or permission of instructor.
Not open to students with credit for 624 and 625 or 824 and 825.
Continuation of 672.

Human Neurology I
A. 17 cl. and lab. hrs.
Prereq.: Med. 1st yr. standing or permission of instructor.
Not open to students with credit for 642 or 826.
The gross and microscopic anatomy of the human brain and spinal cord with special emphasis on the reaction systems.

Human Neurology II
W. 17 cl. and lab. hrs.
Prereq.: Med. 1st yr. standing and 681 or permission of instructor.
Not open to students with credit for 643 or 826.
Continuation of 681.

Human Neurology III
Sp. 51 cl. and lab. hrs.
Prereq.: Med. 1st yr. standing, 682, or permission of instructor.
Not open to students with credit for 642 and 643 or 826.
Continuation of 682.

Individual Studies in Anatomy
Su., A., W., Sp. 1 cl., 2 8-hr. lab. and/or library hrs.
Prereq.: 15 cr. hrs. in Anat. or allied fields and permission of instructor.
Designed to enable the student to pursue a minor investigation in some anatomical field of his choice.

Anatomical Methods in Electron Microscopy
2 months, offered
Jan., Feb.
P 12
Sp.
G 3
Prereq.: Med. 2nd, 3rd, or 4th yr. standing and permission of instructor; graduate students by permission of instructor.
The preparation of biological materials for electron microscopy and training in the operation of the instrument; a research project may be chosen.

Anatomy of the Newborn
1 month, offered Apr.
P 6
Sp.
G 3
Prereq.: Med. 2nd, 3rd, or 4th yr. standing or graduate standing and permission of instructor.
Gross anatomy of the newborn correlated with prenatal and postnatal development; dissection and section study. Gaughran, Graves, and L. Eglitis.

Topographical Anatomy
1 month, offered Apr., July
P 6
Sp.
G 2-4
Prereq.: Med. 2nd, 3rd, or 4th yr. standing and permission of instructor; graduate students by permission of instructor.
A study of unmounted serial cross sections of selected regions of the human body emphasizing the relationship of structures to one another in a three-dimensional perspective. Gaughran, Graves, and L. Eglitis.

Advanced Regional Dissections
1 month, offered
all months.
P 6, 12, 18
Sp.
G 2-4
Prereq.: Med. 2nd, 3rd, or 4th yr. standing or permission of instructor.
Repeatable to a maximum of 18 cr. hrs. for professional credit.
A careful dissection of one or more regions of the body, supplemented with literature research. Graves.

Human Anatomy: Radiological Manifestations
1 month offered
all months.
P 6, 12, 18
Sp.
G 2-4
Prereq.: Med. 2nd, 3rd, or 4th yr. standing and permission of instructor; graduate students by permission of instructor.
Repeatable to a maximum of 18 cr. hrs. for professional credit.

Anatomy of the Visual System
Sp. 2 cl., 2 3-hr. labs.
Prereq.: 653, 663, 673, 683, or equiv., and permission of instructor; resident standing in Ophthal.
The gross anatomy, histology, neuroanatomy, and embryology of the human visual apparatus; its structure, function, and some clinical applications. L. Eglitis.
793
Individual Studies in Anatomy
1 month, offered
all months: P 6, 12, 18
Su, A, W, Sp. C 3 or 5
Prereq.: Permission of instructor.
Repeatable to a maximum of 24 hr. for professional credit.

793.31 Blood and Hemopoiesis
Morphology of normal and abnormal human blood and bone marrow; developmental hemopoiesis and cellular immune response in various animals. Ackerman and St. Pierre.

793.32 Connective Tissue and Bone
Activities of fibrous connective tissues emphasizing formation and maintenance of fibers and ground substance; dynamics of the structure, chemistry, and metabolism of bone. J. Eglitis, Meftli, and Wismar.

793.42 Embryology
Mammalian embryological development emphasizing descriptive or experimental approach; metabolic aspects of development including enzymatic changes, hormonal effects, environmental factors, and teratogenic agents. Deiphia, Hayes, Sucheston, Vernall, Welch, and Wismar.

793.44 Microscopic Anatomy
Advanced studies in selected areas of microscopic anatomy. Ackerman, J. Eglitis, Hayes, Vernall, and Wismar.

793.52 Neuroanatomy
Individual literature review, initiation to research techniques, or small research project related to the nervous system. Clark, Dom, Humbertson, King, and Martin.

793.62 Epithelium
Covering, lining, and glandular divisions; functional significance of exocrine and endocrine glands. J. Eglitis.

793.72 Human Gross Anatomy
In-depth study of special topics by dissection, literature research, or other methods of original investigation. I. Eglitis, Gaughran, Martin, and Welch.

793.82 Electron-Microscopy
Examination of specific tissues or cellular populations using electron micrographs; no actual use of the electron microscope. Ackerman, King, and Martin.

793.92 Tissue Culture
Dynamics of cell population from principles and applications of tissue culture methods combined with other techniques such as autoradiography and drug administration. Hayes and St. Pierre.

793.10 Principles of Human Cytogenetics
Human cytogenetics as related to autosomal and sex chromosomes; technique of tissue culture for study of human chromosome(s) and karyotype analysis. Hayes.

793.11 Design of Computer Teaching Programs
Methods and logic of writing subject oriented computer assisted instruction (CAI) programs. Wismar and Christopher.

8179* (711) G 5
Comparative Neurology
W. 3 cl., 3 2-hr. labs.
Prereq.: 618 or 642, or 826, or 683, and permission of instructor.
A phyletogenic approach toward an appreciation of neurology; consideration of development and refinement of specific tracts from invertebrates to man.

840 G 3
Medical Education
Su, A, W, Sp. 3 cl.
Prereq.: Permission of instructor.
Introductory experiences in administrative and functional aspects of all phases of medical education, including observation of methods, evaluation, curriculum design, student selection, and educational research. Ingersoll.

850 (830) G 1
Seminar in Anatomy
Discussions of research in progress and reports from the literature of current anatomical problems.

999 (950) G Arr.
Research in Anatomy
Research for thesis or dissertation purposes only.

Anesthesiology
Office: 632 University Hospital, 410 West Tenth Avenue

Professor: Hamelberg (Chairman); Associate Professors: Collins, Garvin, and Lenahan; Assistant Professors: Anderson, Besi, DeLeo, Franklin, Gauthier Imboden, Kinsely, Levere, Siddall, E. Warner, and Welch.

737 P 1
Clinical Anesthesiology
16 cl. hrs.
Prereq.: Med. 4th yr. standing; concur. 5 or 11 cr. hrs. Surg. 736.
(Offered concur. with Surg. 736.) Didactic instruction, demonstration, and clinical observation of anesthetic agents and techniques, covering fundamentals of cardiopulmonary resuscitation, use of local anesthetic agents, inhalation therapy, premedication, and anesthetic agents and techniques. Hamelberg and Staff.

793
Individual Studies in Anesthesia
1, 2, 3, or 4 months;
offered all months: P 6, 12, 18
Prereq.: Permission of instructor.
Repeatable to a maximum of 24 cr. hrs. for professional credit; repeatable to a maximum of 15 cr. hrs. for graduate credit. Designed to offer to medical and graduate students an opportunity to pursue research related to anesthesia in either basic science or clinical science. Hamelberg and Staff.
794 P 6
Group Studies in Anesthesia
1 month, offered all months.
Prereq.: Med. 3rd or 4th yr, standing.
Repeatable to a maximum of 12 cr. hrs.
Course designed to give medical students clinical experience in the administration of anesthesia. Hamei and Staff.

798 P 18
Internship in Anesthesiology
12 months full time, beginning July 1.
Prereq.: Appointment as Intern, University Hospital.
Repeatable to a maximum of 72 cr. hrs.
Broad exposure to principles of anesthesia: experience in operating rooms, wards, and emergency rooms; rounds; conferences.

799 P 18
Residency in Anesthesiology
12 months full time, beginning July 1.
Prereq.: Appointment as Resident, University Hospital.
Repeatable to a maximum of 360 cr. hrs.
Rotation through services of anesthesiology; rounds; conferences.

850 G 3 or 5
Seminar in Anesthesiology
Prereq.: Permission of instructor.
Group and individual discussions of current problems in anesthesiology and their management; discussions of basic and applied topics.

999 G Arr.
Research in Anesthesiology
Research for thesis purposes only.

GENERAL PREREQUISITES FOR COURSES NUMBERED 200
Unless otherwise indicated, the prerequisites for 200-level courses are 25 cr. hrs. in 100-level courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-199.

200 (401) U 5
Introductory Animal Science
A, W, Sp. 3 cr., 2 2-hr. lab.
Introduction to selection, breeding, feeding, management, marketing, and utilization of beef cattle, swine, and sheep; a limited discussion of the horse is included. Plimpton, Stevens, and McGrew.

250 (407) U 3
Meat Science and Identification
A, W, Sp. 3 2-hr. lab.
The structure and composition of beef, pork, veal, and lamb are used to distinguish grades and usefulness of meat products for domestic and institutional purposes. Kunkel.

GENERAL PREREQUISITES FOR COURSES NUMBERED 300 AND 400
Unless otherwise indicated, the prerequisites for 300 and 400-level courses are 90 cr. hrs. in 100-level courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-399.

420 U 5
Principles of Animal Improvement
A, W, Sp. 5 cr.
Prereq.: 100, Math. 150 or equiv., and Genetics 314.
Not open to students with credit for Dairy Sc. 420 or Poul. Sc. 420.
(Cross-listed in the Depts. of Dairy Sc. and Poul. Sc.)
An introduction to the methods available for bringing about genetic change in farm animals. Fechheimer, Jaap, and Swiger.

430 (530) U 5
Principles of Animal Nutrition
A, W, Sp. 4 cr., 1 2-hr. lab.
Prereq.: Chem. 102 or 122 and Math. 150 or equiv.
Not open to students with credit for Dairy Sc. 430 or Poul. Sc. 430.
(Cross-listed in the Depts. of Dairy Sc. and Poul. Sc.)
A study of the fundamental principles of nutrition in mammals and birds. Cline and Tynik. Fee.

440 (515) U 5
Livestock Management
W, Sp. 3 cr., 2 2-hr. lab.
Prereq.: 200 and 430.
Open to Agr. Ed. majors only.
Feeding, breeding, and managing of beef, sheep, and swine; laboratory exercises are concerned with major management problems.

450 (509) U 5
Meat and Meat Products
A, W, Sp. 3 cr., 2 3-hr. lab.
Prereq.: 200 and 430.
Selection of slaughter animals to illustrate the relationship of breeding, feeding, and management to carcass yield, cost, and cut-out value; emphasis on meat processing. Cahill and Plimpton.

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Animal Science
Office: 110 Animal Science Building, 2029 Fyffe Road

Professors Johnson (Chairman), Barner, Cahill, Cline, Grimshaw, Harvey, Klosterman (Associate Chairman, Wooster), Kottman, Kunkle, Ludwig, Moxon, Preston, Reed, Teague, Tynik, Venzke, and R. F. Wilson; Associate Professors Barnes, Dehorney, Martin, Newland, Ockerman, Parker, Swiger, Van Stavern, and G. R. Wilson; Assistant Professors Allhouse, Dahm, Hullun, Judy, Mahan, Plimpton, Smith, and Wharton; Instructors Boyles and Isler.

100 U 5
Domestic Animals in the Service of Man
A, W, Sp. 5 cr.
(Offered in cooperation with the Depts. of Dairy Sc. and Poul. Sc.)
The role of the animal industry in the world and the importance of the application of science in meeting the needs in the production, distribution, and utilization of animal products. Plimpton and Stephens.
Meat Grading
Sp. 1 cl., 2 2-hr. lab.
Prereq.: 200 and 430; 250 for Home Ec. students.
The factors that influence the value of meat animals, carcasses, and wholesale cuts in accordance with recognized grading standards, laboratory practice, and Poultry.

GENERAL PREREQUISITES FOR COURSES NUMBERED 500
Unless otherwise indicated, the prerequisites for 500-level courses are 15 cr. hrs. in courses in the same discipline numbered 200 or higher, or 10 cr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 200 or higher in specified allied disciplines; or baccalaureate degree.

Livestock Selection
Sp. 5 2-hr. lab-discussions.
Prereq.: 200, 430, and 5 additional cr. hrs. in 541, 542, 543, or 544.
Laboratory exercises employing current standards of animal excellence including carcass quality for the selection and improvement of farm livestock. G. R. Wilson.

Livestock Marketing
(See Agr. Econ. 522.)
(Offered in cooperation with the Dept. of Animal Sc.)

Horse Production and Management
W. 3 cl., 2 2-hr. lab.
Prereq.: 200, 430, and 5 additional cr. hrs. in Animal Sc., or Dairy Sc.
The application of science and basic principles of nutrition, genetics, physiology, and marketing to the production and management of horses.

Beef Cattle Production and Management
A. Sp. 3 cl., 2 2-hr. lab.
Prereq.: 200, 430, and 5 additional cr. hrs. in Animal Sc., Dairy Sc., or Poul. Sc.
The application of science and basic principles of nutrition, genetics, physiology, and marketing to the production and management of beef cattle. G. R. Wilson.

Swine Production and Management
A. Sp. 3 cl., 2 2-hr. lab.
Prereq.: 200, 430, and 5 additional cr. hrs. in Animal Sc., Dairy Sc., or Poul. Sc.
Selection of breeding stock, reproduction, feeding, management, and sale of commercial and breeding swine; swine herds, markets, and research stations are visited. R. F. Wilson.

Sheep Production and Management
W, Sp. 3 cl., 2 2-hr. lab.
Prereq.: 200, 430, and 5 additional cr. hrs. in Animal Sc., Dairy Sc., or Poul. Sc.
The application of science and basic principles of nutrition, genetics, physiology, and marketing to the production and management of sheep. Judy.

Meat Processing
A. 2 cl., 1 2-hr. lab.
Prereq.: 450.
Fundamental changes in soft animal tissue resulting from comminution and application of chemicals and heat. Cahill.

Individual Studies
H593 (honors) may be available to students enrolled in a college honors program or eligible for enrollment.
Prereq.: Junior or senior standing and permission of instructor.
Special assignments and elementary research; problems assigned after consultation with instructor in charge.

Group Studies
Prereq.: Junior or senior standing and permission of instructor.
Special assignments and elementary research; problems assigned after consultation with instructor in charge.

GENERAL PREREQUISITES FOR COURSES NUMBERED 600
Unless otherwise indicated, the prerequisites for 600-level courses are 15 cr. hrs. in courses in the same discipline numbered 300 or higher, or 10 cr. hrs. in courses numbered 300 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 300 or higher in specified allied disciplines.

Physiology of Lactation
A. 2 2-hr. cl.
Prereq.: Vet. Physiol. 211 and 20 cr. hrs. of Dairy Sc., Animal Sc., or vertebrate biology.
Not open to students with credit for Dairy Sc. 610.
(Cross-listed in the Dept. of Dairy Sc.)
The physiological, endocrine, nutritional, and environmental factors influencing the synthesis and ejection of milk. Barr and Porter.

Physiology of Reproduction and Growth
Sp. 3 1-hr. lec.
Prereq.: Vet. Physiol. 211 and 20 cr. hrs. of Dairy Sc., Animal Sc., or vertebrate biology.
Not open to students with credit for Dairy Sc. 612.
(Cross-listed in the Dept. of Dairy Sc.)
Physiology of the reproductive system and growth and development in farm animals; factors influencing reproductive performance. Ludwig.

Laboratory in Reproductive Physiology and Artificial Insemination
Sp. 2 2-hr. lab.
Prereq. or concur.: 612.
Not open to students with credit for Dairy Sc. 613.
(Cross-listed in the Dept. of Dairy Sc.)
Comparative anatomy and physiology of reproduction of farm animals; physiological bases for the use of artificial insemination in research laboratory and in the field. Ludwig.
630 U G 5
Nutrition and Feeding of Monogastric Animals
A, W, Sp. 4 cl., 1 2-hr. lab.
Prereq.: 430 or equiv.
Not open to students with credit for Poul. Sc. 630.
(Cross-listed in the Dept. of Poul. Sc.)
The nutrition of swine, poultry, and laboratory animals; principles and practice. Cline and Mahan. Fee.

631 U G 5
Nutrition and Feeding of Ruminant Animals
Su, A, W, Sp. 4 cl., 1 2-hr. lab.
Prereq.: 430 or equiv.
Not open to students with credit for Dairy Sc. 631.
(Cross-listed in the Dept. of Dairy Sc.)
The nutrition of dairy cattle, beef cattle, and sheep; principles and practice. Staubs and Tynik. Fee.

650 (619) U G 3
Advanced Meat Technology
Sp. 2 cl., 2 1-hr. lab.
Evaluation of scientific contribution to meat products and processing. Ockerman.

651 U G 3
Laboratory Analysis of Meat Products
W. 2 cl., 1 2-hr. lab.
Prereq.: 450, 10 cr. hrs. Chem., and 5 cr. hrs. Microbiol.
Analysis of meat products by physical, chemical, and microbiological techniques. Ockerman. Fee.

693 (701) U G 3-5
Individual Studies
H693 (honors) may be available to students enrolled in a college honors program or eligible for enrollment.
Prereq.: Permission of instructor.
Special assignments and advanced research; problems assigned after consultation with the instructor in charge.

694 (701) U G 3-5
Group Studies
Prereq.: Permission of instructor.
Special assignments and advanced research; problems assigned after consultation with the instructor in charge.

GENERAL PREREQUISITES FOR COURSES NUMBERED 700
Unless otherwise indicated, the prerequisites for 700-level courses are 15 cr. hrs. in courses in the same discipline numbered 600 or higher.

710 U G 3 or 5
Advanced Reproductive Physiology
Sp. 2 2-hr. cl.
Prereq.: 512 and acceptable courses in Physiol., Anat., and Biochem.
Not open to students with credit for Dairy Sc. 710.
(Cross-listed in the Dept. of Dairy Sc.)
Recent advances in research in mammalian reproduction; optional individual research experience in reproductive problems with small and large mammals for additional credit. Gomes and VanDemark.

720 U G 5
Genetics of Animal Populations
W. 5 cl.
Prereq.: 420 or Genetics 630, and 30 cr. hrs. Math.
Not open to students with credit for Dairy Sc. 720 or Poul Sc. 720.
(Cross-listed in the Deps. of Dairy Sc. and Poul. Sc.)
Theory and practice of analyzing and altering the genetic composition of animal populations. Swiger.

GENERAL PREREQUISITES FOR COURSES NUMBERED 800 AND 900
Unless otherwise indicated, the prerequisites for 800 and 900-level courses are 30 cr. hrs. in courses in the same discipline, or 20 cr. hrs. in the same discipline, plus 25 cr. hrs. in specified allied disciplines.

800 (810) G 1
Seminar
Prereq.: Animal Sc. grad. standing.
Discussions of current animal science research.

810 G 3
Advances in Physiology of Domestic Animals
A, W, Sp. 4-hr. cl.
Prereq.: Permission of instructor and acceptable courses in Physiol., Anat., and Biochem.
Not open to students with credit for Dairy Sc. 810 or Poul Sc. 810.
(Cross-listed in the Deps. of Dairy Sc. and Poul. Sc.)
810.01* Adrenal Function
A.
Brown and Gomes.
810.02* Endocrinology of Reproduction
W.
Gomes.
810.03* Immunology and Immunogenetics
Sp.
Hines.
810.04* Thyroid and Parathyroid Function
A.
Hibbs.
810.05* Mammalian Germ Cells
W.
VanDemark.
810.06* Biometry and Animal Performance
Sp.
Ludwick.

820 G 3
Current Topics in Animal Genetics
3 cl.
Prereq.: Acceptable courses in Animal Genetics, Math., and Statistics.
Not open to students with credit for Dairy Sc. 820 or Poul. Sc. 820.
(Cross-listed in the Deps. of Dairy Sc. and Poul. Sc.)
820.01 Selection Index Theory
Sp.
Anthropology

Office: 13 Page Hall, 65 South Oval Drive

Professors Williams (Chairman), Bourguignon, Estel, Lehlite, and Willmore; Distinguished Visiting Professor Morris; Adjunct Associate Professor Baby; Assistant Professors Arewa, Callaghan, Hall, Little, McCollough, Poirier, Schwarz, and Young.

210 (503) U 5
Introduction to Ethnology
A, W, Sp. 5 cl.
Prereq.: 2nd yr. standing.
A comparative survey of tribal peoples in basic world areas—Asia, Africa, Oceania, North and South America. Williams.

251 (502) U 5
Introduction to Physical Anthropology
A, W, Sp. 5 cl.
Prereq.: 2nd yr. standing.
The organic development of man; human evolution; the modern groupings of man. Poirier.

261 (501) U 5
Introduction to Anthropology
A, W, Sp. 5 cl.
Prereq.: 2nd yr. standing.
An introductory survey of the field of anthropology, with emphasis upon the prehistoric development of culture; behavior of man illustrated by the simpler societies.

412 (630) U 4
Indians of the Americas
Sp. 4 cl.
Prereq.: 5 cr. hrs. Anthrop., or equiv. or permission of instructor.
American Indian cultures of the time of European conquest.

414 (634) U 4
Ethnology of Asia
W. 4 cl.
Prereq.: 5 cr. hrs. of Anthrop., or equiv. or permission of instructor.
A survey of the peoples of Asia; high civilizations and tribal cultures; prehistoric origins of Asian cultures; the distribution of physical types; languages; social customs. Young.

415 (635) U 4
Ethnology of Africa
A. 4 cl.
Prereq.: 5 cr. hrs. of Anthrop., or equiv. or permission of instructor.
The peoples of Africa south of the Sahara; distribution of physical types; languages; cultural areas; West Coast kingdoms as source of the American Negro. Arewa.
Dynamics of American Culture
A. 3 cl.
Prereq.: 5 cr. hrs. of Anthrop., or equiv. or permission of instructor.
Not open to students with credit for 401.
A review of American customs, institutions, social systems, and ideas, with emphasis on recent cultural anthropological studies. Bourguignon.

Social Relations in Folk Societies
A. 4 cl.
Prereq.: 5 cr. hrs. of Anthrop., or equiv., or permission of instructor.
Not open to students with credit for 410.
Forms of social organization in simpler societies; dynamics of social relations in such societies; a comparison of simpler forms of social structure with complex forms. Arewa.

Culture Contact and Technological Change
Sp. 4 cl.
Prereq.: 261 and Soc. 101 or 201 or equiv. or permission of instructor.
Consequences for folk societies of the diffusion of Euro-American culture; introduction of advanced technology to underdeveloped areas; cultural aspects of colonialism and military government. Schwarz.

Religion in Folk Societies
W. 4 cl.
Prereq.: 5 cr. hrs. of Anthrop., or equiv. or permission of instructor.
Not open to students with credit for 610.
World views in folk societies, emphasizing religion and sacred beliefs; integration of these beliefs with social organization and the arts. Bourguignon.

Culture Patterns and Personality
Sp. 3 cl.
Prereq.: Soc. 470 or equiv. or Psychol. 320 or equiv. or permission of instructor.
Not open to students with credit for 509.
Anthropological contributions to the field of social psychology; variations in personality as associated with variations in culture; the range of personality differences within various cultures. Bourguignon.

Theory and Problems of Cultural Anthropology
W. 4 cl.
Prereq.: 20 cr. hrs. in allied subjects or permission of instructor.
Not open to students with credit for 570.
Major theoretical viewpoints in cultural anthropology; significance of the cultural approach; applied anthropology in psychology and other social sciences.

Fossil Man
W. 4 cl.
Prereq.: 251 or equiv., or 15 cr. hrs. in Biological Sciences or Geol. or permission of instructor.
Not open to students with credit for 450.
A comprehensive study of the fossil hominids; fossils of Homo sapiens and their relation to other fossil hominids. Poirier and Little.

Physical Variability of Modern Man
Sp. 4 cl.
Prereq.: 251 or equiv., or 15 cr. hrs. in Biological Sciences, including Genetics, or permission of instructor.
Not open to students with credit for 450.
The racial classification of man on a biological basis; the evolution of Homo sapiens and the development of human variability; racial differences and mixtures. Poirier and Little.

Osteometry
W. 1 hr. lec., 3-hr. lab.
Prereq. or concur.: 530 or equiv. or permission of instructor.
Not open to students with credit for 454.
Laboratory measurements of human skeletons. Baby.

Anthropometry
Sp. 1 hr. lec., 3-hr. lab.
Prereq. or concur.: 535 or equiv. or permission of instructor.
Not open to students with credit for 456.
Laboratory measurements of living human beings. Baby.

Research Methods in Physical Anthropology
A. 3 cl.
Prereq.: 15 cr. hrs. of Anthrop. or 10 cr. hrs. of Anthrop. and 10 cr. hrs. of closely related work, or permission of instructor.
Not open to students with credit for 640.
Methods used in the analysis and classification of man in both comparative and evolutionary approaches. Poirier and Little.

American Indian Prehistory
A. 4 cl.
Prereq.: 5 cr. hrs. of Anthrop., or equiv. or permission of instructor.
Not open to students with credit for 460.
A survey of American Indian archaeology; the origin and development of Indian culture from the first peopling of the continent to the coming of Europeans. Hall.
Principles of Research in Archaeology
Sp.
Prereq.: 263 or equiv. plus 5 additional cr. hrs. of Anthrop. or 10 cr. hrs. of work closely related to archaeological field research, and permission of instructor.
Not open to students with credit for 662.
Instruction in basic methods of archaeological analysis, including artifact typology and cultural classification; methods of excavation and recording; one-day or weekend field sessions. Baby.

Archaeological Training Expedition
Su. 8 cr. hrs. for either term.
(Full time in expedition camps.)
Prereq.: 555 or equiv. or 10 cr. hrs. of work closely related to archaeological field research, and permission of instructor.
Not open to students with credit for 664.
Joint expedition of The Ohio State University Department of Anthropology, and the Ohio State Museum, engaged in excavating prehistoric sites in Ohio; experience in archaeological field work. Baby and Staff.

Introduction to Anthropological Linguistics
W. 4 cr.
Prereq.: 10 cr. hrs. of Anthrop. or permission of instructor.
Not open to students with credit for 430.
Relations of language to social organization, worldview, socialization, and cultural analysis. Callaghan.

Individual Studies
Prereq.: 30 cr. hrs. in Anthrop. or permission of instructor.
Not open to students with previous credit for alphabetical subdivisions of 693, Special Problems.

Theory

History

Anthropological Linguistics

Research Methodology

Prehistory

Ethnography

Physical Anthropology

Unclassified

Honors Course
Prereq.: 4th yr. standing with a grade of A in at least half of the Anthrop. courses and an average of B in the remainder; permission of the instructor under whose supervision the work is to be completed and the Honors Committee of the College. At least 2 qtrs. are required of candidates for the degree Bachelor of Arts with Distinction in Anthrop. Failure to receive a grade of B in this course is a disqualification for special honors.
Repeatable to a maximum of 15 cr. hrs.

Seminars in Anthropology
a. Theory
b. History
c. Anthropological Linguistics
d. Prehistory
e. Ethnology
f. Physical Anthropology
g. Cultural Anthropology
h. Unclassified

Seminars in Ethnology
A, W, Sp. 1 2-hr. cl.
Repeatable to a maximum of 30 cr. hrs., not more than 5 of which shall be in any one of the following topics.
a. North America
b. South America
c. East Asia
d. Southeast Asia
e. Oceania
f. South Asia
g. Middle East
h. Africa
i. Europe
j. Circumpolar

Seminars in Cultural Anthropology
A, W, Sp. 1 2-hr. cl.
Repeatable to a maximum of 30 cr. hrs., not more than 5 of which shall be in any one of the following topics.
a. Nature of Culture
b. Acculturation, Change, and Stability
c. Culture and Personality
d. Enculturation
e. Social Organization
f. Religious Behavior
g. Field Methods in the Study of Culture
h. Theory and Problems in Cultural Anthropology
i. Peasant Cultures
j. Cultural Evolution
k. Human Ecology

Seminars in Physical Anthropology
A, W, Sp. 1 2-hr. cl.
Repeatable to a maximum of 30 cr. hrs., not more than 5 of which shall be in any one of the following topics.
a. Theory and Method in Physical Anthropology
b. Serology
c. Primate Structure and Behavior
d. Fossil Man
e. Osteometry
f. Anthropometry
g. Physical Variability of Man
h. The Physical Anthropology of Selected World Culture Regions

Seminars in Prehistory
A, W, Sp. 1 2-hr. cl.
Repeatable to a maximum of 30 cr. hrs., not more than 5 of which shall be in any one of the following topics.
a. Method and Theory in Archaeology
b. North American Archaeology
c. South American Archaeology
d. European Archaeology
e. Asian Archaeology
f. African Archaeology
g. Oceanic Archaeology
h. Archaeology of High Civilizations
i. Special Problems in Archaeology
840 G 3-5
Seminars in Anthropological Linguistics
A, W, Sp. 1 2-hr. cl.
Repeatable to a maximum of 30 cr. hrs., not more than 5 of which shall be in any one of the following topics.
(Affiliated in cooperation with the Dept. of Ling.)
- Animal Communication and Human Language
- Social Structure and Language
- Enculturation and Language
- Languages and Cultural Structuring of Perceptual Patterns
- Ethnography of Language
- Language as a Research Tool in Ethnography, Ethnology, and Cultural Anthropology

850 G 3
Seminars in Museology
A, W, Sp. 1 2-hr. cl.
Repeatable to a maximum of 9 cr. hrs., not more than 3 of which shall be in any one of the following topics.
- Introduction
- Problems
- Research Methods

896 G 1-3
Interdepartmental Seminar in Polar and Alpine Studies
Sp.
(See under Interdepartmental Seminars.)

899 G 1-5
Interdepartmental Seminar
(See under Interdepartmental Seminars.)

999 G Arr.
Research in Anthropology: Dissertation
Research for dissertation purposes only.

Arabic

Office: 248 Dieter Cunz Hall of Languages, 1841 Millikin Road
Professor Bulatkin (Chairman); Assistant Professor Cadora.

101 U 5
Introduction to Modern Literary Arabic
A. 5 cl., 3 lab. hrs.
Sound and writing systems, morphological patterns, basic sentences with brief dialogues.

102 U 5
Introduction to Modern Literary Arabic
W. 5 cl., 3 lab. hrs.
Prereq.: 101.
Continuation of morphological patterns and basic syntactic structures, with long dialogues and simple pieces of expository prose.

106 U 3
Conversational Arabic
W. 2 cl., 2 lab. hrs.
Prereq.: Permission of instructor.
Introduction to the phonology and grammar of the spoken language of educated urbanites of the Eastern Arab world.

107 U 3
Conversational Arabic
Sp. 2 cl., 2 lab. hrs.
Prereq.: 105 or permission of instructor.
Continuation of 106; analysis of and drill in morphological and syntactic patterns; expansion of vocabulary; practice in conversation.

112 U 5, 10, 15
Intensive Modern Literary Arabic
Su. 15 cl. Enrollment limited to 25 students.
Prereq.: Permission of chairman.
Full time of student and full fees required.
Equiv. of 101, 102, and 601. Students with credit for 101 or the equiv. may not register for more than 10 hrs. Students with credit for 101 and 102 or the equiv. may not register for more than 3 hrs. Students with credit for 601 or the equiv. may not register for credit.
Elementary and intermediate literary Arabic; intensive drill in forms, syntax, vocabulary and idioms; reading of selected material in modern Arabic.

271 U 3
Introduction to Arabic Literature in Translation
A. 3 cl.
A general survey of classical and medieval Arabic literature in its historical and cultural context.
601  UG 5
Modern Literary Arabic
Sp. 5 cl., 3 lab. hrs.
Prereq.: 102.
Presentation of complex morphological forms and
reintroduction and expansion of the basic syntactic
structures of modern literary Arabic with readings on
various aspects of Arabic culture.

602  UG 5
Modern Literary Arabic
A. 5 cl., 3 lab. hrs.
Prereq.: 601.
Review of morphology and introduction of complex
syntactic structures found in journalistic and formal
expository writings.

606  UG 5
Classical Arabic I
Sp. 5 cl.
Prereq.: 602.
Elements of Classical and Medieval Literary Arabic
grammar; selected readings from Eastern Arabic
literary works.

609  UG 5
Classical Arabic II
A. 5 cl.
Prereq.: 608.
Selected readings from Western (especially Spanish)
Arabic literary works.

621  UG 5
Contemporary Arabic Readings
A. 5 cl.
Prereq.: 602.
Reading of contemporary expository prose selections
on a variety of technical subjects such as politics,
anthropology, religion, literature, language, and social
mores.

622  UG 5
Contemporary Arabic Short Stories
W. 5 cl.
Prereq.: 621.
Reading of a selection of modern short stories by
some of the representative writers in the Arab world.

623  UG 5
Contemporary Arabic Poetry
Sp. 5 cl.
Prereq.: 621.

626  UG 5
Introduction to the Qur'an
W. 5 cl.
Prereq.: 609.
A linguistic and cultural analysis of selected chapters
from the Qur'an.

694  UG 1-15
Group Studies in Arabic
Prereq.: Permission of instructor.
Repeatable to a maximum of 30 cr. hrs.

793  UG 1-5
Individual Studies in Arabic
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.

794  UG 1-15
Group Studies in Arabic
Prereq.: Permission of instructor.
Repeatable to a maximum of 30 cr. hrs.

Architecture

Office: 106 Brown Hall, 190 West 17th Avenue

Professors: Whitaker (Director), Baumer (Emeritus),
Borchers, Clark, Jhilian, Ronan (Emeritus), Tilley,
and Wilson (Emeritus); Associate Professors: Bowser,
Brinkers, and Coddington; Assistant Professors: Dipn
and Young; Adjunct Assistant Professor: Passe;
Instructors.

111  (411)  U 5
Introductory Architectural Design
A. 1 cl., 14 lab. hrs.
Open only to students enrolled in School of
Architecture.
An introduction to architectural design, through
exercises in graphics, delineation, techniques, and
space organization; library research and individual
criticism. Bowser and Staff.

112  (412)  U 5
Introductory Architectural Design
W. 1 cl., 14 lab. hrs.
Prereq.: 111.
Continuation of 111.

113  (413)  U 5
Introductory Architectural Design
Sp. 1 cl., 14 lab. hrs.
Prereq.: 112.
Continuation of 112.

211  (511)  U 5
Elementary Architectural Design
A. 1 cl., 14 lab. hrs.
Prereq.: 113.
Elementary problems in architectural design dealing
with organization of space for human occupancy;
library research, individual criticism, and lectures.
Phillian and Staff.

212  (512)  U 5
Elementary Architectural Design
W. 1 cl., 14 lab. hrs.
Prereq.: 211.
Continuation of 211.
213 (513) U 5
Elementary Architectural Design
Sp. 1 cl., 14 lab. hrs.
Prereq.: 212.
Continuation of 212.

393 U 1-5
Individual Studies in Architecture
Prereq.: Permission of School.
For students not majoring in Arch. who desire to pursue special studies in the field of Arch.
Repeatable to a maximum of 15 cr. hrs.

511 (611) U 5
Intermediate Architectural Design
A. 1 cl., 14 lab. hrs.
Prereq.: 213.
Intermediate problems in architectural design dealing with space analysis and site planning; presented in an integrated and related series of building types.
Clark and Staff.

512 (612) U 5
Intermediate Architectural Design
W. 1 cl., 14 lab. hrs.
Prereq.: 511.
Continuation of 511.

513 (613) U 5
Intermediate Architectural Design
Sp. 1 cl., 14 lab. hrs.
Prereq.: 512.
Continuation of 512.

521 U 3
Elementary Architectural Construction
A. 1 cl., 6 lab. hrs.
Composition, manufacture, physical properties, standards, and uses of basic building materials; theory, methods, codes, and specifications of architectural construction; preparation of contract drawings. Dippner and Staff.

522 U 3
Elementary Architectural Construction
W. 1 cl., 6 lab. hrs.
Prereq.: 521.
Continuation of 521.

523 U 3
Elementary Architectural Construction
Sp. 1 cl., 6 lab. hrs.
Prereq.: 522.
Continuation of 522.

601 (604) U 3
History of Ancient Architecture
A. 3 cl.
Analysis of primitive structures and ancient architecture before the Christian era to illustrate basic principles of shelter, natural building techniques, and organization of space. Borchers.

602 (605) U 3
History of Medieval and Renaissance Architecture
W. 3 cl.
Analysis of architecture from the early Christian era through the Baroque, related to the spirit of the age, social organization, and increasing structural knowledge. Borchers.

603 (606) U 3
History of Contemporary Architecture
Sp. 3 cl.
Analysis of architecture from the Industrial Revolution to the present, reflecting changes of society, fashion and architectural practice; new materials and structural techniques. Borchers.

611 (711) U 6
Advanced Architectural Design
A. 1 cl., 17 lab. hrs.
Prereq.: 513.
Advanced problems in architectural design dealing with space organization in relation to group composition and community patterns; library research and individual criticism. Young and Staff.

612 (712) U 6
Advanced Architectural Design
W. 1 cl., 17 lab. hrs.
Prereq.: 611.
Continuation of 611.

613 (713) U 6
Advanced Architectural Design
Sp. 1 cl., 17 lab. hrs.
Prereq.: 612.
Continuation of 612.

621 U 4
Intermediate Architectural Construction
A. 2 cl., 6 lab. hrs.
Prereq.: 513 and 523; concur. 661.
Continuation of composition, manufacture, physical properties, standards, and uses of basic building materials; theory, methods, codes and specifications of architectural construction; preparation of contract drawings.

622 U 4
Intermediate Architectural Construction
W. 2 cl., 6 lab. hrs.
Prereq.: 621; concur. 662.
Continuation of 621.

623 U 4
Intermediate Architectural Construction
Sp. 2 cl., 6 lab. hrs.
Prereq.: 622; concur. 663.
Continuation of 622.
661   U 4
Architectural Building Equipment
A. 3 cl., 3 lab. hrs.
Concur.: 611.
Fundamentals of operating services; installation of
approved equipment; application of building, fire
prevention, and safety codes; specifications and
preparation of working drawings. Dipner and Fasse.

662   U 4
Architectural Building Equipment
W. 3 cl., 3 lab. hrs.
Prereq.: 661; concur. 612.
Continuation of 661.

663   U 4
Architectural Building Equipment
Sp. 3 cl., 3 lab. hrs.
Prereq.: 662; concur. 613.
Continuation of 662.

689   (631)   U 2
Inspection Trip
Sp.
Prereq.: Arch., or Land. Arch., 3rd or 4th yr. standing.
Taken between Winter and Spring Quarters; trip to
inspect architects' offices and buildings in Ohio and
neighboring states; written report required. Fee.

693   U G 1-5
Individual Studies in Architecture
Prereq.: Permission of School.
For students majoring in Arch. desiring to pursue
special studies not offered in the fixed curriculum.
Repeatable to a maximum of 15 cr. hrs.

700   (707)   U 3
Allied Arts
A. 3 cl.
Prereq.: Arch. 5th yr. standing.
Analysis of arts related to architecture and the
expression of the nature of materials in architectural
ornament, furniture and furnishings, and the garden.
Borchers.

711   (714)   U 7
Advanced Architectural Design and Thesis
A. 2 cl., 18 lab. hrs.
Prereq.: 611 and 5th yr. standing in Arch.
The thesis problem summarizes all the student's
architectural experiences as an undergraduate, and
includes a complete analysis of building types, library
research, design presentation, and working drawings.
Coddington and Staff.

712   (715)   U 7
Advanced Architectural Design and Thesis
W. 2 cl., 18 lab. hrs.
Prereq.: 711.
Continuation of 711.

713   (716)   U 10
Advanced Architectural Design and Thesis
Sp. 2 cl., 24 lab. hrs.
Prereq.: 712.
Continuation of 712.

721   (781)   U 5
Advanced Architectural Construction
A. 3 cl., 6 lab. hrs.
Concur.: 711, and 5th yr. standing in Arch.
Theory and methods, codes and specifications
pertaining to basic parts of advanced architectural
construction, and preparation of working drawings.

722   (782)   U 5
Advanced Architectural Construction
W. 3 cl., 6 lab. hrs.
Prereq.: 721.
Continuation of 721.

723   (783)   U 5
Advanced Architectural Construction
Sp. 3 cl., 6 lab. hrs.
Prereq.: 722.
Continuation of 722.

751   (754)   U 3
Professional Practice
A. 3 cl.
Prereq.: 5th yr. standing in Arch.
Organization of the construction industry as
background for legal and economic bases of
architectural documents, programs, designs, working
drawings, specifications, contracts, bonds, and
supervision forms. Clark.

752   (755)   U 3
Professional Practice
W. 3 cl.
Prereq.: 5th yr. standing in Arch.
Procedural and substantive aspects of architectural
practice: office organization, private and governmental
relations, code compliance, estimates, and bid analysis
exercises assigned from research materials. Clark.

801   G 2
Seminar
A. 2 cl.
Prereq.: Admission to grad. curriculum in Arch. or
permission of instructor.
Evolution of the professional practice of architecture;
developments in architectural theory and education;
problems in the contemporary practice of
architecture. Brinkers.

802   G 2
Seminar
W. 2 cl.
Prereq.: 801.
Continuation of 801. Brinkers.
ART

Office: 440 Hopkins Fine Arts Center, 128 North Oval Drive

Associate Professor Hall (Acting Chairman), Professors Chaletz, Csuri, Freeman, Friley, R. Gatreel, King, and Sherman; Associate Professors Baughman, Black, M. Gatrell, Heiner, Hewett, Krueger, Krumm and Wynne; Assistant Professors Jensen, Johnston and Katz; Instructors Chapin, Cherullo, Gearhart, Hisselle, Raabe, Ramage, Shineman, and Sweeney.

170 U 5
Drawing and Fine Arts Orientation
A, Sp. 5 3-hr. labs., 1 lec.
Open only to majors in the Divisions of Art, Art Education, Design, and History of Art, and to majors in Medical Illustration, except by permission of the Division of Art chairman.
Not open to students with credit for Fine Arts 170 or 423.
Introduction to studio activity; laboratory experience, with emphasis on drawing and design; lectures and discussion about field of specialization in art. Fee.

171 U 5
Drawing
A, W. 5 2-hr. labs.
Prereq.; 170 or Fine Arts 170 or permission of instructor.
Not open to students with credit for Fine Arts 171 or 423.
The use of various drawing media with continuation of the underlying principles as utilized in 170; laboratory and field problems. Fee.

175 U 5
Painting
W, Sp. 5 2-hr. labs.
Prereq.; 171 or Fine Arts 171.
Not open to students with credit for Fine Arts 175 or 550.
Emphasis on the use of color, drawing, and design in the development of a personal idiom of expression; opaque media; laboratory and field problems. Fee.

180 U 5
Sculpture
Su, A, W, Sp. 3 3-hr. labs., 6 hrs. arr.
Prereq.; 170 or Fine Arts 170.
Not open to students with credit for 581 or Fine Arts 180, 581 or 461.
An introduction to the principles of sculpture, emphasizing basic forming processes and materials. Fee.

190 U 3
Introduction to Fine Art Activities
Su, A, W, Sp. 1 cl.; 4 lab. hrs.
Not open to candidates for the degrees B.F.A. and B.S. in Ed. with Art, Design, or Hist. of Art as a major, nor to students with credit for 170 or 290, or Fine Arts 170, 190, 290, or 401.
An introduction of visual form, its perception, development, and use through studio experience. Fee.
240 U 3
Elementary Ceramic Art
A, W, Sp. 1 cl., 6 lab. hrs.
Not open to majors in Art, Design, or Hist. of Art or to students with credit for Fine Arts 240 or (491).
Introduction to the art phases of the ceramic field; laboratory practice in the hand forming process. Fee.

242 U 3
Introduction to Ceramic Art
A, W, Sp. 1 cl., 6 lab. hrs.
Open only to majors in Art, Art-Educ., Design and Hist. of Art.
Not open to students with credit for Fine Arts 242.
Introduction to the Ceramic Arts through the use of the potter’s wheel with lectures covering a broad survey of the field of ceramics.

244 U 5
Ceramic Art Laboratory I
Su, A, W, Sp. 15 lab. hrs.
Prereq.: 240 or 242 or Fine Arts 240 or 242, or permission of instructor.
Not open to students with credit for Fine Arts 244 or (491).
Laboratory practice utilizing the potter’s wheel as a basis for more involved forming processes. Fee.

245 U 5
Ceramic Art Laboratory II
A, W, Sp. 15 lab. hrs.
Prereq.: 244 or Fine Arts 244 or permission of instructor.
Not open to students with credit for Fine Arts 245 or (490).
Laboratory practice in designing ceramic wares with emphasis on the hand forming processes. Fee.

246 U 5
Ceramic Art Laboratory III
A, W, Sp. 15 lab. hrs.
Prereq.: 245 or Fine Arts 245 or permission of instructor.
Not open to students with credit for Fine Arts 246 or (502). Fee.

272 U 5
Life Drawing
Su, A, W, Sp. 5 3-hr. labs.
Prereq.: 171 or Fine Arts 171.
Not open to students with credit for Fine Arts 272 or (505).
Drawing from the human figure, using a variety of media; discussion of drawing as related to important styles; laboratory problems and field trips. Fee.

273 U 5
Oil Painting
Su, A, W, Sp. 5 3-hr. labs.
Prereq.: 175 or Fine Arts 175.
Not open to students with credit for Fine Arts 273 or (526).
Painting from still life, with the object of developing the color sense and acquiring directness of presentation; problems in the organization and execution of pictures. Fee.

274 U 5
Water Color Painting
Su, Sp. 5 3-hr. labs.
Prereq.: 171 or Fine Arts 171.
Not open to students with credit for Fine Arts 274 or (527).
Special emphasis on water color’s unique capacities for personal expression; problems in landscape, still life, and the figure. Fee.

276 U 5
Introduction to Printmaking
A, W, Sp. 5 2-hr. labs.
Prereq.: 171 or Fine Arts 171.
Not open to students with credit for Fine Arts 276 or (528).
The basic tools, methods, and materials of printmaking; study and examination of original prints. Fee.

280 U 5
Construction Sculpture
A, W, Sp. 3 3-hr. labs., 8 hrs. arr.
Prereq.: 180 or Fine Arts 180.
Not open to students with credit for Fine Arts 280 or (534).
Study of three-dimensional form through the use of power and hand tools. Fee.

281 U 5
Modeling and Carving
Sp. 3 3-hr. labs., 8 hrs. arr.
Prereq.: 180 or Fine Arts 180.
Not open to students with credit for Fine Arts 281.
An intermediate studio course dealing with modeled and carved sculpture in media such as clay, wax, wood, plaster, and stone. Fee.

282 U 5
Life Sculpture
A, W, Sp. 3 3-hr. labs., 8 hrs. arr.
Prereq.: 180 and 272 or Fine Arts 180 and 272, or permission of instructor.
Not open to students with credit for Fine Arts 282 or (582).
Aspects of the human form studied in relation to the materials of sculpture; experimentation in a choice of materials: clay, wax, cement, plaster, and metal. Fee.

290 U 5
Fundamentals of Art
Su, A, W, Sp. 5 2-hr. labs.
Not open to majors in Art, Art-Educ., Design, or Hist. of Art, or to students with credit for Fine Arts 290 or (430).
An introduction to art through studio experience, exploring two-dimensional and three-dimensional media, by an analysis of form, and expression. Fee.

295 U 3
Drawing
A, 6-hr. lab.
Prereq.: Arch. 2nd yr. standing.
Not open to students with credit for Fine Arts 295 or (402).
Visual fundamentals as expressed through drawings; emphasis upon configuration and visual relationships. Fee.
296 U 3
Drawing from Life
W. 6-hr. lab.
Prereq.: Arch. 2nd yr. standing and 295 or Fine Arts 295.
Not open to students with credit for Fine Arts 296 or (411).
Drawing from the human figure, study of gesture and planar relationships in two and three dimensional space. Fee.

297 U P 3
Form Organization
A, Sp. 3 2-hr. labs.
Prereq.: Dent. 1st yr. standing or Arch. 2nd yr. standing.
Not open to students with credit for Fine Arts 297 or (406).
Drawing and sculpture, with emphasis on visual organization. Fee.

441 U 5
Ceramic Composition
A. 2 cl., 4 2-hr. labs.
Not open to students with credit for Fine Arts 441 or (593).
Ceramic computations course for art students; methods of representing ceramic composition; laboratory study and discussion of raw materials and their uses in bodies and glazes.

442 U 5
Ceramic Composition
W. 2 cl., 4 2-hr. labs.
Prereq.: 441 or Fine Arts 441.
Not open to students with credit for Fine Arts 442 or (594).
Laboratory practice in development of the aesthetic aspects of ceramic glazes and bodies; methods of presenting their fired composition and correction faults. Fee.

443 U 5
Ceramic Composition
Sp. 2 cl., 4 2-hr. labs.
Prereq.: 442 or Fine Arts 442.
Not open to students with credit for Fine Arts 443 or (595).
Laboratory study and development of individual projects leading to creation of ceramic compositions of aesthetic merit; further studies in texture and color. Fee.

468 U 5
Elements of Weaving
A, W, Sp. 5 2-hr. labs.
Prereq.: 290 or Design 251 or Fine Arts 251 or 290, or permission of instructor.
Not open to students with credit for Fine Arts 468 or (572).
An introduction to the creative and functional aspects of handweaving; experience in the construction, warping, threading, and the manipulation of both standard and modern design techniques.

469 U 3
Weaving
A, W, Sp. 3 2-hr. labs.
Prereq.: 468 or Fine Arts 468.
Not open to students with credit for Fine Arts 469 or (573).
The use of weaving materials and equipment, with an emphasis on creative design of functional and decorative fabrics.

550 U 3
Development of Interior Design I
A. 3 cl.
Prereq.: History of Art 210, 211, and 212 or Fine Arts 210, 211, and 212, or Hist. 101 and 102 or equiv.
Not open to students with credit for Fine Arts 550 or (605).
A survey of European interiors from 1300 to 1850, followed by a study of French design from Louis XIII through the Empire period. Fee.

551 U 3
Development of Interior Design II
W. 3 cl.
Prereq.: 550 or Fine Arts 550.
Not open to students with credit for Fine Arts 551 or (606).
A study of the Tudor, Jacobean, Carolean, Georgian, and Regency Periods—considering the aesthetic, political, and economic implication. Fee.

552 U 3
Development of Interior Design III
Sp. 3 cl.
Prereq.: 551 or Fine Arts 551.
Not open to students with credit for Fine Arts 552 or (607).
A survey of American interiors since 1650, followed by a study of the development of interior design in the western world since 1880; field trips. Fee.

570 U 5
Advanced Life Drawing
Su, A, W, Sp. 5 3-hr. labs.
Prereq.: 272 or Fine Arts 272.
Not open to students with credit for Fine Arts 570 or (625).
Advanced problems in drawing from life and figure composition. Fee.

573 U 5
Advanced Oil Painting
Su, A, W, Sp. 5 3-hr. labs.
Prereq.: 272 and 273 or Fine Arts 272 and 273.
Not open to students with credit for Fine Arts 573 or (660).
Painting in oil from still life and the costume model; advanced problems in composition. Fee.

580 U G 5
Ceramic Sculpture
W. 3 3-hr. labs., 6 hrs. arr.
Prereq.: 281 or Fine Arts 281.
Not open to students with credit for Fine Arts 580.
An advanced level studio course dealing with various methods of building and firing clay sculpture; emphasis on clay's unique structural and forming possibilities. Fee.
581  U G 5  
Welded and Forged Sculpture  
Sp.  3 3-hr. labs., 6 hrs. arr.  
Prereq.: 280 and 281 or Fine Arts 280 and 281.  
Not open to students with credit for Fine Arts 581.  
An introduction to metal construction in sculpture by  
epoxy/cyanate welding, arc welding, and forming  
methods with forge and hammer.  Fee.

582  U G 5  
Sculpture Foundry  
A.  3 3-hr. labs., 6 hrs. arr.  
Prereq.: 280, 281, and 282 or Fine Arts 280, 281 and 282.  
Not open to students with credit for Fine Arts 582 or  
(T28).  
An introduction to traditional and experimental  
methods used in the development and casting of  
sculpture; experience in the operation of foundry  
material and equipment.  Fee.

612  U G 5-15  
Study Tour in Art  
Prereq.: 175 and 180, or Fine Arts 175 and 180, or  
permission of instructor.  
First hand investigation of source material to be  
found abroad; including meetings and discussions with  
international members of the art community.

640  U G 5  
Studio Kilns and Firing Practices  
A.  15 lab. hrs.  
Prereq.: Permission of instructor.  
Not open to students with credit for Fine Arts 640.  
The design, construction, and use of simple gas and  
electric ceramic studio kilns; practice in the various  
types and methods of firing.  Fee.

641  U G 5  
Ceramic Reproduction Processes  
W.  15 lab. hrs.  
Prereq.: Permission of instructor.  
Not open to students with credit for Fine Arts 641.  
Studies in the designing, fabrication, and uses of  
models and molds in such multiple ceramic  
production processes as casting, jiggering, and  
pressing.  Fee.

642  U G 5  
Advanced Ceramic Laboratory  
Sp.  15 lab. hrs.  
Prereq.: Permission of instructor.  
Not open to students with credit for Fine Arts 642.  
Design and construction of large ceramic art forms.  
Fee.

677  U G 5  
Graphic Processes  
W.  5 3-hr. labs.  
Prereq.: 175 or Fine Arts 175.  
Open to Grad. students with 15 cr. hrs. in drawing and  
painting.  
Not open to students with credit for Fine Arts 677 or  
(643).  
Lithography and serigraphy explored by students as  
part of their professional experience in print-making.  
Gateell.  Fee.

678  U G 5  
Graphic Processes  
A.  5 3-hr. labs.  
Prereq.: 175 or Fine Arts 175.  
Open to Grad. students with 15 cr. hrs. in drawing and  
painting.  
Not open to students with credit for Fine Arts 678 or  
(688).  
Woodcuts, etchings, and engravings explored by  
students as means for individual expression.  Chafetz.  
Fee.

680†  U G 5  
Large Sculpture Projects  
Sp.  5 3-hr. labs.  
Prereq.: 280 and 281 or Fine Arts 280 and 281.  
Not open to students with credit for Fine Arts 680.  
An advanced level studio course dealing with  
large-scale sculpture constructed in relation to  
arhitecture.  Fee.

681  U G 5  
Advanced Figurative Sculpture  
A, W.  3 3-hr. labs., 6 hrs. arr.  
Prereq.: 281 and 282 or Fine Arts 281 and 282.  
Not open to students with credit for Fine Arts 681 or  
(729).  
An advanced level studio course dealing with  
individual study of the relationship of sculpture to the  
model; various media.  Fee.

693  U G 2.5  
Individual Studies  
Prereq.: Permission of instructor.  
Each decimal subdivision repeatable to a maximum  
of 45 cr. hrs.  
Advanced study for students in specialized programs.  
693.03  Ceramics  
693.06  Printmaking  
693.07  Weaving  
693.09  Drawing  
693.10  Painting  
693.11  Sculpture  
Group Studies
Prereq.: Permission of instructor.
Each decimal subdivision repeatable to a maximum of 15 cr. hrs.
Group studies for students in specialized programs.
694.03 Ceramics
694.06 Printmaking
694.07 Weaving
694.09 Drawing
694.10 Painting
694.11 Sculpture
694.12 Intermedia

Professional Problems and Issues for Studio Artists I
A. 1 2-hr. cl.
Not open to students with credit for Fine Arts 695.
A seminar dealing with teaching disciplines and research specializations of studio faculty and faculty from related areas of study.

Professional Problems and Issues for Studio Artists II
Sp. 1 2-hr. cl.
Not open to students with credit for Fine Arts 696.
Current events, directions, and movements in art.

Perception-Art Form Seminar
W. 2 cl.
Not open to students with credit for Fine Arts 879 or (705).
Seminar utilizing the Ames Visual Demonstration Center as a basis for discussion of perception and aesthetic form. Sherman.

Advanced Sculpture
A.
Not open to students with credit for Fine Arts 881 or (818).
Advanced sculpture with a wide range of choice in media. Fee.

Advanced Sculpture
W.
Prereq.: 881 or Fine Arts 881.
Not open to students with credit for Fine Arts 885 or (819).
Continuation of 881. Fee.

Advanced Sculpture
Sp.
Prereq.: 885 or Fine Arts 885.
Not open to students with credit for Fine Arts 887 or (829).
Continuation of 885. Fee.

Research Problems in Ceramics
Repeatable to a maximum of 45 cr. hrs. Fee.

Research Problems in Printmaking
Repeatable to a maximum of 45 cr. hrs. Fee.

Research Problems in Sculpture
Repeatable to a maximum of 45 cr. hrs. Fee.

Individual Studies
Each decimal subdivision repeatable to a maximum of 45 cr. hrs.
993.03 Ceramics
993.06 Printmaking
993.10 Painting
993.11 Sculpture

Group Studies
Prereq.: Permission of instructor.
Each decimal subdivision repeatable to a maximum of 15 cr. hrs.
Group studies for students in specialized programs.
994.03 Ceramics
994.06 Printmaking
994.10 Painting
994.11 Sculpture
994.12 Intermedia

Research in Art
Research for thesis and dissertation purposes only.
Art Education

Office: 340 Hopkins Fine Arts Center, 128 North Oval Drive

Professors Barkan (Chairman) and Severing; Associate Professors Chapman (on leave), Efland, and Orr; Assistant Professors Duncan, Kern, McWhinnie, Norris, and Zernich; Instructor Lloyd.

200 U G 4
Orientation to Art Education
W. 2 cr., 2 2-hr. labs.
Prereq.: 2nd yr. standing.
Not open to students with credit for Fine Arts 200 or (409).
Historical and current issues in art education, laboratory experience in preparing teaching materials, tryout and assessment of teaching skills. Fee.

401 U G 5
Art Education Laboratory
A. W. 5 3-hr. labs.
Prereq.: 200 or Fine Arts 200, and Ed. P. standing.
Not open to students with credit for Fine Arts 401 or (548).
Laboratory problems with a variety of design materials, with attention to the nature of different media and their educational potential. Fee.

402 U G 4
Art Education Laboratory
Sp. 7 lab. hrs.
Prereq.: 401 or Fine Arts 401.
Not open to students with credit for Fine Arts 402 or (548).
Study of children's development in art; laboratory participation for critical observation and supervised teaching in an art program for children. Fee.

500 U G 3
Art for Elementary Teachers
Su, A, W, Sp. 3 2-hr. labs.
Prereq.: Art 290 or Fine Arts 290.
Not open to students with credit for Fine Arts 500 or (570).
Problems of teaching in terms of personal knowledge about art, insight into children's art work, and understanding of elementary school curriculum. Fee.

501 U G 4
Art Workshop for Elementary Teachers
Su.
Prereq.: Elem. Ed. 4th yr. standing.
Full time of student for 3 wks.
Not open to students with credit for Fine Arts 501 or (799).
Laboratory experiences with art media toward understanding the visual arts; study of children's art expression; problems of teaching the arts in the elementary school program.

603 U G 4
Theory of Art Education
A. 9-hr. lab.
Prereq.: 402, Ed. 435, and 461.
Not open to students with credit for Fine Arts 603 or (600).
Problems of art education in the public schools; observation in the public schools.

693 U G 2-5
Individual Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 45 cr. hrs.
Advanced study for students in specialized programs.

694 U G 2-5
Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Group studies for students in specialized programs.

804 G 3-5
Research Problems in Art Education
Not open to students with credit for Fine Arts 804 or (718).
Problems of art education at the elementary, secondary, and college level, individual student problems will be initiated in light of current educational needs. Barkan, Chapman, and Efland.

805 G 5
Art Education in the Elementary Schools
A.
Not open to students with credit for Fine Arts 805 or (710).
The role of the Art Supervisor for curriculum development and instruction in the elementary school program. Barkan, Chapman, and Efland.

806 G 5
Art Education in the Secondary Schools
Not open to students with credit for Fine Arts 806 or (714).
The role of the Art Supervisor for curriculum development and instruction in the secondary school program. Barkan, Chapman, and Efland.

807 G 3-5
Minor Seminar for the Practicing Art Teacher
Not open to students with credit for Fine Arts 807 or (713).
Curriculum problems in teaching the visual arts; studio work in related arts; theoretical considerations. Barkan, Chapman, and Efland.

911 G 3-5
Research Problems in Art Education
Su, A, Sp.
Repeatable to a maximum of 45 cr. hrs.
Astronomy

Offices: 5040 Physics and Astronomy Building, 174 West 18th Avenue; Perkins Chemistry, Delaware, Ohio

Professors: Sletten (Chairman), Brodowski (Emeritus), Czyzak, Keenan, Keller, Ko, Kraus, Mitchell, and Protheroe; Associate Professors: Caplicki and Collins; Assistant Professors: Ehrman, Newsom, Roark, and Wing; Lecturer: Byard.

150 (500) U 5
Descriptive Astronomy
Su, A, W, Sp. 5 cl.
Not open to students with credits for 101, 102, 191 or 192.
An introductory course emphasizing the place of astronomy in man’s cultural and scientific development.

191 (401) U 5
General Astronomy I
A. 4 cl., 1 1-hr. cl. lab.
Prereq.: or concur.: Math. 150 or equiv. or permission of instructor.
Not open to students with credit for 101 or 150.
Astronomy 191 and 192 form a comprehensive introduction to modern astronomy; 191 deals with the solar system and the earth as an astronomical body.

192 (402) U 5
General Astronomy II
W. 4 cl., 1 1-hr. cl. lab.
Prereq.: Either 101, 191 or permission of instructor.
A continuation of 191 with emphasis on the stellar universe and physical astronomy.

301 U 3
Observational Astronomy
Sp. 2 3-hr. labs.
Prereq.: Either 101, 102, 191, 192, or 150, and permission of instructor.
Selected intermediate level experiments and observations for the obtaining and treatment of astronomical data.

601* U G 3
History of Astronomy
W. 3 cl.
Prereq.: Either 101, 102, 191, 192, or permission of instructor.
Babylonian, Egyptian, Chinese, and Mayan Astronomy; Greco-Roman period and Middle Ages; Renaissance and Reformation; modern trends in Astronomy.

605+ U G 3
Introduction to Celestial Mechanics
W. 3 cl.
Prereq.: Math. 255 or 555, and Physics 111 or 222 and 233; or 132 and 133; or permission of instructor.
Application of the laws of motion to planets, satellites, and stars; the two-, three-, and N-body problems; introduction to orbit and perturbation theory.
611  UG 3  
Spherical Astronomy  
W.  3 cl.  
Prereq.: Either 101, 191, 150, or equiv.; Math. 254; and Physics 112 or 121, or 231; or permission of instructor.  
The application of spherical trigonometry to stellar positions and motions; stellar coordinate systems;  
time; fundamental measurements of star positions.

650  UG 4  
Stellar Astronomy  
A.  2 2-hr. cl.  
Prereq.: Either 102, 192, or 150; Math 254; Physics 232 and 233 or 132 and 133; or permission of instructor.  
Distances, motions, luminosities, and masses of stars;  
the motions and distribution of stars and interstellar matter; star clusters and galaxies.

651  UG 4  
Introduction to Astrophysics  
W.  2 2-hr. cl.  
Prereq.: Physics 551 or 705 or equiv., and Math. 255 or 556; or permission of instructor.  
Study of radiation from stars and nebulae to determine the composition and physical conditions of matter in  
and between the stars; stellar nuclear energy sources.

652  UG 4  
Solar System  
Sp.  2 2-hr. cl.  
Prereq.: 101 or 191 or 150; Math. 152 or 254; Physics 132 or 133 or 232 or 233; or permission of instructor.  
The physical nature of the solar surface, planets, satellites, comets, asteroids, meteors, and diffuse matter in the solar system; cosmogony of the solar system.

659*  UG 3  
Astronomical Uses of Applied Mathematics  
A.  2 1½-hr. cl.  
Prereq.: 650 and Math. 255 or permission of instructor.  
Application of numerical methods for solution of integral, differential, and linear equations of particular  
interest to astronomy; treatment of aspects of statistics of particular relevance to astronomy.

693  (700)  UG 1-15  
Individual Studies in Astronomy  
Prereq.: Permission of instructor.  
Repeatable to a maximum of 40 cr. hrs.  
Independent library or laboratory work on a special problem in observational or theoretical astronomy.

785  (751)  UG 3  
Observational Techniques I  
A.  
Prereq.: 611 and 651, Physics 657, and 705; or permission of instructor.  
Astronomical spectroscopy, astrometry, photographic and photoelectric photometry.

786  (752)  UG 3  
Observational Techniques II  
W.  
Prereq.: 785.  
Continuation of 785.

787  (753)  UG 3  
Observational Techniques III  
Sp.  
Prereq.: 785.  
Continuation of 786.

Radio Astronomy Instrumentation  
(See Elec. E. 715.)

801  G 1  
Astronomy Seminar I  
A.  1 cl.  
Prereq.: 10 cr. hrs. each in 600-level courses or higher in Astron., Physics, and Math., or permission of  
instructor.  
Repeatable to a maximum of 8 cr. hrs.  
Seminars conducted on astronomical topics of current interest; students will participate actively in the  
presentation and discussion of materials.

802  G 1  
Astronomy Seminar II  
W.  1 cl.  
Prereq.: 801.  
Repeatable to a maximum of 8 cr. hrs.  
Continuation of 801.

803  G 1  
Astronomy Seminar III  
Sp.  1 cl.  
Prereq.: 802.  
Repeatable to a maximum of 8 cr. hrs.  
Continuation of 802.

821*  G 3  
Stellar Atmospheres I  
A.  2 1½-hr. cl.  
Prereq.: 651, Physics 626, 707, Math. 550, 556, or equiv.; or permission of instructor.  
Stellar classification and spectra of peculiar stars; interpretation of continuous and line spectra of stars.

822*  G 3  
Stellar Atmospheres II  
W.  2 1½-hr. cl.  
Prereq.: 821.  
Continuation of 821.

823*  G 3  
Stellar Atmospheres III  
Sp.  2 1½-hr. cl.  
Prereq.: 822.  
Continuation of 822.

841†  G 3  
Stellar Statistics and Kinematics  
A.  2 1½-hr. cl.  
Prereq.: 650, 651, Math. 550, 556, Physics 627, and Statistics 421 or 521, or equiv.; or permission of  
instructor.  
The distributions and motions of the stars and other matter in the Galaxy; the structure of the system.
842*  G 3
Stellar Dynamics
W. 2 1½-hr. cl.
Prereq.: 841.
Dynamics of stellar systems including relaxation times, equilibrium configurations, and stability requirements; discussion of the application of the Boltzmann Equation, Liouville’s and Ergodic Theorems.

843*  G 3
Extragalactic Systems and Cosmology
Sp. 2 1½-hr. cl.
Prereq.: 842.
Morphology, dynamics, and composition of galaxies; hierarchical distribution of matter in space; extragalactic distance scale; ability of observations to discriminate between cosmological data and world models.

850  G 1-5
Current Topics in Astronomy
Prereq.: 10 cr. hrs. in 600-level courses or higher in each of Astron., Physics, and Math., or permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Staff members and visiting lecturers will present material on their current research problems.

851†*  G 3
Stellar Interiors and Stellar Evolution I
A. 2 1½-hr. cl.
Prereq.: 651, Physics 627, 707, Math. 550, 556 or equiv.; or permission of instructor.
The equilibrium equations and physics of stellar interiors; computation of stellar models and evolutionary tracks; stellar pulsation; origin of the elements.

852†*  G 3
Stellar Interiors and Stellar Evolution II
W. 2 1½-hr. cl.
Prereq.: 851.
Continuation of 851.

853†*  G 3
Nebulae and Interstellar Matter
Sp. 2 1½-hr. cl.
Prereq.: 651, Physics 627, 707, and Math. 550, 556 or equiv.; or permission of instructor.
Observational and theoretical aspects of interstellar particles and gas; interstellar lines; reflection, emission and planetary nebulae.

862  (896)  G 3
Radio Astronomy I
W. 3 cl.
Prereq.: 651 and Physics 656 or Elec. E. 810 or permission of instructor.
Fundamental theory of radio astronomy and interpretation of basic radio observations; given in collaboration with the Department of Electrical Engineering.

863  (897)  G 3
Radio Astronomy II
Sp. 3 cl.
Prereq.: 862 or permission of instructor.
Advanced theory of generation, propagation and absorption of cosmic radio waves; given in collaboration with the Department of Electrical Engineering.

895  G 1-5
Interdepartmental Seminar in Radio-Astronomy
(See under Interdepartmental Seminars.)

999  (950)  G Arr.
Research in Astronomy and Astrophysics
Research for thesis or dissertation purposes only.

Aviation

Office: Ohio State University Airport, 3160 Case Road
Professor Eggertshuler (Chairman); Associate Professor Billings; Assistant Professors Chapman, Easter, Hubbard, and Weigold; Instructors.

111  (507)  U 3
Introduction to Aviation
W. 3 cl., 1 field trip.
A comprehensive study of the nation’s air transportation system.

201  (506)  U 1
Primary Flight
Su, A, W, Sp. 5 lab.
Prereq. or concurs.: 211 and secure permission slip at University Airport prior to scheduling.
A laboratory course provided for students to achieve greater understanding of 211. Fee.

211  (505)  U 4
Elements of Aviation
Su, A, W, Sp. 3 cl., 2 lab.
Prereq.: Math. 116 and Physics 111; or equiv.
Problems in fundamentals of flight and aircraft operation; objective studies of aviation laws and regulations.

401  (600)  U 1-4
Advanced Flight
Su, A, W, Sp. 5 lab.
Prereq.: 201 and secure permission slip at University Airport prior to scheduling.
The student must register for specific studies in areas indicated below, and may register for more than one at a time.
Repeatable to a maximum of 4 cr. hrs.
   a. Precision Flight Maneuvers. Fee.
411  U 3  Aircraft Performance
A. 3 cl.
Prereq.: 211.
Studies of airframe components, performance and design characteristics, power plants, and federal certification of aircraft equipment.

415  U 3  Air Traffic Control and Flight Meteorology
W. 3 cl.
Prereq.: 211 and Physics 120.
Precision navigational techniques for position control, flight planning and cruise control, aids to navigation, fundamentals of meteorological analysis, and effects of weather on flight.

419  U 3  Analysis of Problems in Aviation Safety
Sp. 3 cl.
Prereq.: 411 and 415.
Detailed analysis of standard and proposed procedures relating to safety, studies in pilot behavior, accident investigation and safety programs.

Biochemistry

Office: Graduate Research Center for Biological Sciences, 484 W. 12th Avenue

Professors: Serif (Chairman), Barber, Behrman, Bulen, Deathrage, Harper, Ives, Moore, Snell, Van Winkle, and Vernon; Associate Professors: Doskotch, Daugell, McConnell, and Scott; Assistant Professors: Collins, Gross, Klapper, Mayer, Meleca, and Zubkoff.

511  U 4  Introduction to Biological Chemistry
Su, A, Sp. 3 cl.
Prereq.: Chem. 211 and 2 qtrs. of Biological Sciences, or permission of instructor.
An introductory course in biochemistry dealing with the molecular basis of structure and metabolism of plants, animals, and microorganisms.

513  U 4  Biochemistry and Molecular Biology
W. 3 cl.
Prereq.: 2 qtrs. of Organic Chem.; 2 qtrs. of Biol. Students registering for 4 cr. hrs. are required to demonstrate knowledge in depth of a specified topic. Not open to students with credit for 511 without permission of instructor.
An introductory course in biochemistry and molecular biology dealing with the molecular basis of structure and function of life forms.

514  U 4  Biochemistry and Molecular Biology
Sp. 3 cl.
Prereq.: 513.
Students registering for 4 cr. hrs. are required to demonstrate knowledge in depth of a specified topic. Not open to students with credit for 511 without permission of instructor.
Continuation of 513.

521  U  G 3  Introduction to Biological Chemistry: Laboratory
Su, A, Sp. 2 3-hr. labs.
Prereq. or concurr.: 511.
Laboratory work to accompany 511. Assay techniques for chemical constituents and metabolic reactions of living cells. Fee.

541  U  G 3  Biochemistry of Animal Function Laboratory
W. 2 3-hr. labs.
Prereq. or concurr.: 511.
Laboratory course concerned with assay techniques for chemical constituents and metabolic reaction in animals; biochemistry and nutritional deficiency. Fee.

551  U  G 5  Chemistry of Foods and Food Processing
Sp. 3 cl., 2 3-hr. labs.
Prereq.: Chem. 211 and 231 or equiv.
The chemical, physical, and biological nature of foods in relation to handling, processing, packaging, quality, and consumer acceptance.

Biochemistry
(See Chem. 651).
(Offered in cooperation with Chem., Biochem., and Phys. Chem.)

693  U 2-5  G 2-10  Individual Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs. for undergraduate credit and to a maximum of 40 cr. hrs. for graduate credit.

705  U  G 5  General Biological Chemistry
A. 3 cl.
Prereq.: Chem. 242, 244 or 253, 254; Physical Chem. background of Kinetics and Thermodynamics or permission of instructor.
Not open to students with credit for Biochem. 611, 612, 613, or Physiol. Chem. 706.
(Cross-listed in the Dept. of Physiol. Chem.)
An intensive treatment of modern biochemistry; protein structure, enzyme catalyzed reactions, chemistry and metabolism and carbohydrates.

706  U  G 5  General Biological Chemistry Laboratory
W. 2 4-hr. labs.
Prereq. or concurr.: 705; 706, 708, and 710 should be taken in sequence.
Laboratory to accompany 705. Fee.

707  U  G 5  General Biological Chemistry
W. 3 cl.
Prereq.: 705 or Physiol. Chem. 707.
Not open to students with credit for Physiol. Chem. 707. (Cross-listed in the Dept. of Physiol. Chem.)
An intensive treatment of modern biochemistry; energy utilization and electron transport, photosynthesis, membranes and lipid metabolism.
General Biological Chemistry Laboratory
Sp. 2 4-hr. labs.
Prereq.: 706.
Laboratory to accompany 707. Fee.

General Biological Chemistry
Sp. 3 cl.
Prereq.: 707 or Physiol. Chem. 707.
Not open to students with credit for Physiol. Chem. 709.
(Cross-listed in the Dept. of Physiol. Chem.)
An intensive treatment of modern biochemistry; intermediary metabolism of amino acids, proteins and nucleic acids.

General Biological Chemistry Laboratory
Su. 2 4-hr. labs.
Prereq.: 708.
Laboratory to accompany 709. Fee.

Research Principles and Techniques
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs. for undergrad. credit and to a maximum of 40 cr. hrs. for grad. credit. Fee.

Proteins and Nucleic Acids
A. 3 cl.
Prereq.: 709 or equiv.
An examination of the current research on the chemistry and metabolism of proteins and nucleic acids. Ivies.

Enzymes
W. 3 cl.
Prereq.: 709 or equiv.
Advanced studies of enzymes and the mechanism of enzyme action.

Carbohydrates
Sp. 3 cl.
Prereq.: 709, Chem. 635 recommended.
Advanced study of the metabolism of the carbohydrates.

Seminar in Biological Chemistry
A, W, Sp. 1 or 2 cl.
Repeatable to a maximum of 40 cr. hrs.

Special Topics in Food Chemistry
W. 2 cl.
Prereq.: 551; Chem. 243, 321, 322; or equiv.
Advanced study of the chemistry of foods. Deatherage.

Interdepartmental Seminar in Nutrition and Food Technology
Sp. 1 cl.
(See under Interdepartmental Seminars.)

Research in Biochemistry
Research for thesis or dissertation purposes only.

Biological Sciences
Office: Graduate Research Center for Biological Sciences, 484 W. 12th Avenue
For course listing of the Academic Faculties of the College of Biological Sciences see:
Biochemistry
Biology
Biophysics
Botany
Entomology
Genetics
Microbiology
Zoology

Biology
Office: Graduate Research Center for Biological Sciences, 484 W. 12th Avenue

General Biology
Su, A, W, Sp. 3 cl., 2 lab. hrs.
Not open to students with credit in Biol. 102.
An introduction to the biological sciences emphasizing the important concepts and principles which tend to unify the study of life at various levels of organization. Fee.

General Biology
Su, A, W, Sp. 3 cl., 2 lab. hrs.
Prereq.: 100.
Further development of the biological concepts and principles introduced in 100, with emphasis upon the molecular and cellular levels of organization. Fee.

Animal Development and Adaptation
W, Sp. 3 cl., 2-2 hr. labs.
Prereq.: 101.
The origin, evolution, and adaptive diversity of animal life, including anatomy, physiology, embryology, behavior, and social organization. Fee.
Plant Development
A, W, Sp. 3 cr., 2 2-hr. labs.
Prereq.: 101.
An introductory course in plant development at the organismic level, emphasizing physiology, morphology, and anatomy. Fee.

H290† U 1-5
Biological Sciences Honors Colloquium
Prereq.: Participation in the Honors Program of College of Biological Sciences or permission of instructor.
Repeatable to a maximum of 10 cr. hrs.
Discussion of the rationale and instrumentation of specific fields of biological research; topics vary quarterly.

312 (617) U 5 or 6
General Cellular Biology
W. 4 cr., 4 lab. hrs.
Lab. by permission only for students registering for 6 cr. hrs.
Prereq.: 201, 202, and 2 qtrs. of organic chemistry.
Not open to students with credit for 640.
Study of generalized subcellular structures and metabolism emphasizing dependence of function on structure, principles of organization and biosynthesis, and capture and utilization of energy. Byers. Fee.

313 (505) U 5
Introduction to Ecology
A, W. 3 cr., 2 3/4-hr. labs.
Prereq.: 101.
Not open to students with credit for 410.
An introduction to biotic communities, inter-relations of a community with its physical environment, and the application of ecological principles to human affairs. Colinvaux.

420 (509) U 5
Evolution
A, Sp. 5 cr.
Prereq.: Bot. 100 and 101, or 102; Zool. 101.
The principles of organic evolution; demonstrations and discussions of the facts and theories underlying the evolution of man and other living things. Tidd.

610 U G 5
History of Biology
Sp. 5 cr.
Prereq.: 15 cr. hrs. in Biological Sciences at the 400 level or above.
Origin and development of important biological approaches, concepts, and theories including those of the contemporary period. Rudolph.

670 (690) U G 5
Radiation Biology
Su.
Prereq.: High-school teacher status and Zool. 101 or equiv., Physics 514 or concur., 10 cr. hrs. in General Chem. and Physics.
(N.S.F. Summer Institute students only.)
A study of the principles of radiation biology and their application to high school and college teaching.

693† U 2-5 G 2-10
Individual Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs. for undergraduate credit and to a maximum of 35 cr. hrs. for graduate credit.
Some of the areas of faculty specialization available for individual studies in Biology are shown in the Biological Sciences section of the Arts and Sciences Catalog.

694 U 2-5 G 2-10
Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs. for undergraduate credit and to a maximum of 35 cr. hrs. for graduate credit.
Some of the areas of faculty specialization available for group studies in Biology are shown in the Biological Sciences section of the Arts and Sciences Catalog.

673 H 2-5 G 1-10
Honors Course
Su, A, W, Sp. 3 cr.
Prereq.: 4th yr. standing with a grade of A in at least half of the courses in Biological Sciences and an average of B in the remainder; permission of instructor under whose supervision the work is to be completed and the Honors Committee of the College.
At least 2 qtrs. are required of candidates for the degrees Bachelor of Science or Bachelor of Arts with Distinction in a biological science. Failure to receive at least a grade of B in this course is a disqualification for special honors.
Repeatable to a maximum of 15 cr. hrs.
A program of reading and research for each student with individual conferences, reports, and honors thesis.

810† (804) G 8
Ecological Investigations of Biotic Areas of North America
Su (1st term).
Prereq.: Bot. 620 or Zool. 650 or 661, 20 additional graduate cr. hrs. in Biological Sciences and permission of instructor.
Fee of $145 for travel and subsistence.
Full time of the student will be required traveling and living away from the campus; intensive field work in a variety of environments will involve both supervised and independent study. Fee.

860 (817) G 3
Principles of Systematics
A. 2 cr., 2 hr. lab.
Prereq.: 15 cr. hrs. of Zool. or Entom. at the 600 level or above.
A study of the principles and techniques used in the identification, classification, and nomenclature of organisms. Valentine.
Biophysics

Office: Graduate Research Center for Biological Sciences, 404 W. 12th Avenue

Professors: Lipetz (Chairman), Blackwell, Bozler, Corson, Hill, Hollander, Rothstein, Snell, and Van Winkle; Associate Professors: Gilbert, Kornacker, McConnell, Smith, and Stow; Assistant Professors: Cassim and Ingling.

500 U G 3-5
Introduction to Biophysics
A. 3-5 cl.
Prereq.: 1 yr. Physics, 1 yr. General Chem., and 1 qtr. Biol.
An introduction to the attitudes and principles which characterize the physico-chemical understanding of biological systems; examples of current biophysical research.

610 U G 5
Introductory Photobiology
W. 5 cl.
Prereq.: Chem. 121, 122, 123 and 231, 232, and permission of instructor.
A topical course in photochemical reactions for undergraduates or for graduate students not enrolled in the Photochemistry program. McConnell.

700 U G 1
Seminar in Biophysics
Prereq.: PERMISSION OF INSTRUCTOR.
Repeatable to a maximum of 9 cr. hrs.
Fee.

702 U G 1-3
Advanced Experimental Methods in Biophysics
Prereq.: Permission of instructor.
Repeatable to a maximum of 12 cr. hrs.
Fee.

705 U G 5
Psychophysical Measurement
A. 4 cl., 1 2-hr. lab.
Prereq.: Permission of instructor.
A systematic survey of methods used in establishing relations between physical stimulation and sensory response in man; their use in study of vision and audition. Smith and Ingling.

710 U G 5
Sensory Psychophysics
W. 4 cl., 1 2-hr. lab.
Prereq.: Permission of instructor.
Principal input-output characteristics of human sensory systems, primarily vision and audition, as revealed by psychophysical measurement methods, and an evaluation of theoretical models used. Ingling and Smith.

714 U G 5
Biophysics in Cell Membranes
A. 3 cl., 4 lab. hrs.
Prereq.: 1 yr. of Physics, Physical Chemistry, Calculus, 1 course in Animal Biology, and permission of instructor.

The electrical and ionic properties of cellular membranes; techniques of study; electrical characteristics; bioelectric potentials; action potentials. Hollander and Kornacker. Fee.

715 U G 5
Sensory Electrophysiology
W. 4 cl., 1 2-hr. lab.
Prereq.: 1 yr. Physics, 1 yr. General Chem., 1 course in Animal Biol., or permission of Instructor.
Fundamental techniques of electrophysiology and functional arrangement of the sensory receptors and associated nerve pathways; the visual system is considered in detail as an example. Kornacker and Lipetz. Fee.

720 U G 5
Biocybernetics
Sp. 5 cl.
Prereq.: Math. 255, Physics 233, and permission of instructor.
Physical models of organisms: mass, energy and information flow; non-linear oscillators; linear and non-linear control systems; adaptive systems; control system analysis for biologists. Lipetz.

740 U G 3
Introduction to Quantum Biology
Sp.
Prereq.: Physics 131, 132, and 133, or equiv.; Physics 551 or equiv.; Math. 514, 551, or equiv.; Chem. 971 or equiv.; or permission of instructor.
Quantum mechanics of excited states of conjugated systems of polypeptides and polynucleotides; dynamics of molecular processes involving energy and momentum storage and transfer. Cassim.

Radiation Biophysics
(See Physiol. 746.)

Physical Instrumentation for Biologists
(See Physiol. 748.)

750 U G 3
Biophysics of Motility
W.
Prereq.: Permission of instructor and 1 yr. of Physics. Biological contractile systems—structure and function with emphasis on the molecular level. Cassim. Fee.

760 U G 3
Mechanisms of Psychobiological Integration
W.
Prereq.: Permission of instructor and 1 course in advanced vertebrate or mammalian physiology or physiological psychology. Pharmacol. 822. Physiol. 601-602 or 825-826 are recommended.
All the central nervous system, control and integration of physiologic and behavioral functions by the central nervous system; sensory, visceral, neuroendocrine, psychologic, and genetic factors; effects of stress. Corson.
771 U G 3
Physical Analysis of Organized Systems in Biology
Sp. 3 cl.
Prereq.: 1 course in physical chemistry.
A unified approach to the analysis of structure-function relations in enzymes, membranes, and neural nets based on an extension of statistical thermodynamics. Kornacker.

783 (701) U G 1-5
Individual Studies in Biophysics
Prereq.: Permission of instructor.
Repeatable to a maximum of 10 cr. hrs.

800 G 1-5
Advanced Topics in Biophysics
Prereq.: Permission of instructor.
Repeatable to a maximum of 18 cr. hrs.

805 G 5
Advanced Sensory Psychophysics
Sp. 4 cl., 1-2 hr. lab.
Prereq.: 610, 705, 710, 715 or permission of instructor. Input-output characteristics of human sensory systems; primarily vision and audition, for psychophysical and electrophysiological measurements and data on energy conversion within appropriate sensory cells. Smith and Inglis.

810 G 5
Systems Bioelectricity
Sp. 5 cl.
Prereq.: 715 and Math. 152. The principles of organization of neurons into networks supplying the information handling and control functions needed for the integration and survival of the animal. Lipetz and Kornacker. Fee.

811 G 3
Neural Integration of Multiple Sensory Inputs
Sp.
Prereq.: Mammalian Physiol. Differential coding; gating, selective habituation and disinhibition by integrative centers of the nervous system which modulate auditory, tactile, visual, and kinesthetic stimuli. Hill. Fee.

Bioelectric Potentials
(See Pharmacol. 845.)

999 (950) G Arr.
Research in Biophysics
Research for thesis and dissertation purposes only.

Biostatistics
Office: 112 Mathematics Building, 231 West 18th Avenue
Professors Harvey, Keller, Rustagi, and Whitney; Assistant Professors Ailaje and Srivastava.

601 U G 3
Stochastic Processes in the Biological Sciences
A. 3 cl.
Prereq.: Math. 520 and at least 10 cr. hrs. in Biol. Introduction to discrete stochastic processes, random walk, Markov Chains, birth and death processes, epidemic process, processes for competing among species, diffusion processes, and applications.

605 U G 3
Population Dynamics
W. 3 cl.

610 U G 3
Statistical Bioassay I
Sp.
Prereq.: Math. 528 or 521, and Pharmacol. 500; or permission of instructor. Direct assays, dose-response relationships, parallel line and slope ratio assay, special statistical designs in assay, Bayesian bioassay; examples.

611† U G 3
Statistical Bioassay II
Su. 3 cl.
Prereq.: 610. Continuation of 610.

616 U G 5
Computer Applications in the Biomedical Sciences
Su.
Prereq.: Permission of instructor. Introduction to computer programming languages such as FORTRAN, ALGO, COBOL; packaged statistical programs; medical applications of computers; differential diagnosis, radiation treatment dose planning, electrocardiogram analysis.

800 G 2-5
Advanced Topics in Biostatistics I
A.
Prereq.: Permission of instructor. Repeatable to a maximum of 20 cr. hrs. Topics from current research in biostatistics.

801 G 2-5
Advanced Topics in Biostatistics II
W.
Prereq.: Permission of instructor. Repeatable to a maximum of 20 cr. hrs. Continuation of 800.
Advanced Topics in Biostatistics III
Sp.
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.
Continuation of 801.

Research in Biostatistics
Research for dissertation purposes only.

Botany
Office: 104 Botany and Zoology Building, 1735 Neil Avenue

Professors Schmitt (Chairman), Alexander, Allison, Blaydes, Bohnig, Diller, Elliott, Janson, Meyer, Paddock, Partyka, Popham, Rudolph, Schmitthenner, Schoof, Swanson, Taft, and Williams; Associate Professors Allred, Bendixen, Bradfute, Giesy, Gilbert, Herr, and T. Johnson; Assistant Professors Cline, G. Collins, Fratianne, Garraway, Gordon, Larsen, Platt, Rastorfer, Stuecky, Stuessy, and Young.

General Botany
Prereq.: Biol. 100.
Not open to students with credit for 100 or 500.
An observation and discussion course with emphasis on the structure, processes, and reproduction of the seed plants. Fee.

Local Flora
Su, Sp. 4 2-hr cl; several Sat. field trips.
Prereq.: 101 or 102 or 500.
A laboratory, field, and discussion course in identifying common Ohio plants; emphasis on taxonomic principles, use of keys and manuals, and field recognition of plants. Stuecky and Stuessy. Fee.

The Plant Kingdom
Sp. 5 cl.
Prereq.: 101 or 102 or 500.
Evolutionary sequences in living representatives of the great plant groups; emphasis on forms especially significant to man. Collins.

Basic Concepts in Botany
A, W.
Prereq.: 10 cr. hrs. Chem.
Not open to students with credit for 100 or 102.
Graduate credit only to participants in the Academic Year Institute.
A course in the basic concepts of botany for advanced students with a fundamental knowledge of chemistry. Taft.

Field Botany
Su (1st term).
Prereq.: 101 or 102 or 500, and 15 additional cr. hrs. in Biological Sciences.
Given only at Franz Theodore Stone Laboratory.
Collection, preservation, field and laboratory identification, and local distribution of plants of the major groups. Stuecky.

Higher Aquatic Plants
Su, A.
a. Su. (4 cr. hrs.) Given only at Franz Theodore Stone Laboratory, 3 all-day cl.
b. A. (5 cr. hrs.) Given only on Columbus campus, 2 cl., 1 4-hr. lab., several Sat. field trips.
Prereq.: 101 or 102 or 500, and 15 additional cr. hrs. in Biological Sciences.
Aquatic plants, other than the sigae of Great Lakes region; field and laboratory work on their identification, and ecological and geographical relations. Stuecky. Fee.

Taxonomy of Vascular Plants
A. 4 2-hr. lab. Several Sat. field trips.
Prereq.: 410 or 610, and 10 additional cr. hrs. in Biological Sciences.
A laboratory, field, and discussion course concerning the classification of vascular plants; emphasis on taxonomic principles, systems of classification, family characteristics and relationships. Stuecky and Stuessy. Fee.

Basic Principles of Plant Ecology
A, Sp. 3 cl., 1 3-hr lab., several Sat. field trips, 1 3-day field trip.
Prereq.: 101 or 102 or 500, and 15 additional cr. hrs. in Biological Sciences.
The establishment, development, succession, and dynamics of plant communities and their interrelations with historic, climatic, soil, and biotic factors. Gilbert. Fee.

Field Plant Ecology
Su (2nd term).
Prereq.: 101 or 102 or 500, and 15 additional cr. hrs. in Biological Sciences.
Given only at Franz Theodore Stone Laboratory.
Principles of plant ecology as exemplified by the study of aquatic and terrestrial habitats; emphasis on field work with supplementary lectures and laboratory work. Gilbert.

Plant Physiology
A, Sp. 3 cl.
Prereq.: 101 or 102 or 500, and 10 cr. hrs. Chem.
631 (606) U G 3
Plant Physiology
Su, W. 3 cl.
Prereq. or concur.: 630.
A continuation of 630; photosynthesis, respiration, and metabolic synthesis, absorption and utilization of mineral salts, digestion, translocation of solutes, growth, reproduction, dormancy. Cline, Fratianne, and Meyer.

632 (667) U G 4
Physiology of Aquatic Plants
Su (2nd term).
Prereq.: 101 or 102 or 500 or equiv. and 20 cr. hrs. of Chem.
Given only at Franz Theodore Stone Laboratory.
Lectures, discussions, laboratory and field work on basic topics in the physiology of aquatic plants.

633 (63) U G 3
Plant Physiology Laboratory
A, Sp. 2 3-hr. labs.
Prereq. or concur.: 630.
An experimental approach to the topics listed under 630, Cline and Fratianne. Fee.

634 (63) U G 3
Plant Physiology Laboratory
Su, W. 2 3-hr. labs.
Prereq. or concur.: 631.
An experimental approach to the topics listed under 631, Cline and Fratianne. Fee.

640 (613) U G 5
Bryophytes, Pteridophytes, and Gymnosperms
Sp. 4 2-hr. labs.
Prereq.: 101 or 102 or 500, and 15 additional cr. hrs. in Biological Sciences.
Comparative structures and life histories of liverworts, mosses, ferns, conifers; heritable variations within and among these groups during geologic time; world distribution, past and present. Collins. Fee.

641 (614) U G 5
Morphology of the Angiosperms
A. 4 2-hr. cl.
Prereq.: 101 or 102 or 500, and 15 additional cr. hrs. in Biological Sciences.
Reproductive mechanisms and processes in angiosperms with application to problems in genetics, plant breeding, and crop production. Blaydes. Fee.

642 (615) U G 5
Plant Microtechnic
W. 2 cl., 2 2-hr. lab.
Prereq.: 101 or 102 or 500, and 15 additional cr. hrs. in Biological Sciences.
Principles and methods of preparing permanent plant tissue microscopic preparations; student has opportunity to prepare a personal slide collection suitable for teaching or research. Fee.

643 (640) U G 5
Developmental Plant Anatomy
Su, W, Sp. 4 2-hr. cl.
Prereq.: 101 or 102 or 500, and 15 additional cr. hrs. in Biological Sciences.
The initiation and development of tissues and organs of vascular plants. Popham. Fee.

644 (665) U G 4 or 5
Algae
Sp. 4 2-hr. cl.
Prereq.: 101 or 102 or 500, and 15 additional cr. hrs. in Biological Sciences.
In Summer Qtr. given only at Franz Theodore Stone Laboratory.
A general course covering identification, growth, reproduction, evolution, distribution and economic importance of the algae. Taft. Fee.

660 (653) U G 5
Mycology
A. 3 cl., 2 2-hr. lab.
Prereq.: 101 or 102 or 500, and 15 additional cr. hrs. in Biological Sciences.

661† (655) U G 3
Industrial Mycology
Sp. 2 cl., 1 2-hr. lab.
Prereq.: Chem. 231 and 232, and 10 cr. hrs. of Biological Sciences at the 300 level or higher.
The relation of fungi, especially saprophytic fungi, to human affairs, with emphasis upon their actual and potential applications in industry. Fee.

662 (658) Medical Mycology
The fungi pathogenic to man, their structure and distribution, and the importance of human mycotic diseases. Schmitt.
662.01 Lecture and Laboratory U G 5
W, Sp. 3 cl., 2 2-hr. lab.
Prereq.: Microbiol. 509 or 607 or Med. Microb. 625, and 10 cr. hrs. in Biological Sciences.
Fee.
662.02 Lecture U G 3
W, Sp. 3 cl.
Prereq.: Microbiol. 509 or 607 or Med. Microb. 625, and 10 cr. hrs. in Biological Sciences.

663 (670) U G 4 or 5
Aquatic Mycology
Su. Sp.
6a. Su. (4 cr. hrs.) Given only at Franz Theodore Stone Laboratory during odd numbered years. 3 all-day cl.
6b. Sp. (5 cr. hrs.) Given only on Columbus campus during even numbered yrs. 3 cl., 2 2-hr. lab.
Prereq.: 101 or 102 or 500, and 15 additional cr. hrs. in Biological Sciences.
A lecture, laboratory, and field course designed to acquaint the student with the fungi found in aquatic habitats including soil water. Schmitt. Fee.

683 (701) U G 1-5
Individual Studies
Prereq.: 101 or 102 or 500, and 15 additional cr. hrs. in Biological Sciences.
Problems may be selected in the fields of taxonomy, morphology, anatomy, physiology, ecology, genetics, cytology, mycology, or lichenology.
694 G 1-5  
Group Studies in Botany  
Prereq.: Permission of instructor.  
Repeatable to a maximum of 10 cr. hrs.  
Group study of special topics in botany.

720 U G 5  
Ecological Relations of World Vegetation  
Sp. 3 cr., 1 3-hr. lab., 1 4-day field trip.  
Prereq.: 620.  
A consideration of the distribution pattern and  
structure of the vegetation of the world with emphasis  
on North America. Fee.

809 (810) G 1  
Botanical Colloquium  
Repeatable to a maximum of 15 cr. hrs.

810* (757) G 5  
Experimental Taxonomy  
A. 3 cr., 2 2-hr. lab., several Sat. field trips.  
Prereq.: 410 or 610, and Genetics 630.  
Biosystematic categories, population analysis of mass  
collections, individual variations, hybridization, and  
introgression are studied in relation to the methods  
and materials of experimental taxonomic research.  
Stuessy. Fee.

819 (835) G 2  
Seminar in Plant Taxonomy  
Prereq.: Permission of instructor.  
Repeatable to a maximum of 30 cr. hrs.  
Stuckey and Stuessy.

829 (825) G 2  
Seminar in Plant Ecology  
Prereq.: 620 and permission of instructor.  
Repeatable to a maximum of 12 cr. hrs.

830* (725) G 3  
Advanced Plant Physiology Laboratory  
A. 6 lab. hrs.  
Prereq.: 631, 10 cr. hrs. in Organic Chem. or Biochem.;  
and 10 additional cr. hrs. Biological Sciences.  
Selected research techniques dealing primarily with  
respiration, photosynthesis, and associated metabolic  
phenomena. Fee.

831† (730) G 3  
Advanced Plant Physiology Laboratory  
Sp. 6 lab. hrs.  
Prereq.: 631, 10 cr. hrs. Organic Chem. or Biochem.;  
and 10 additional cr. hrs. Biological Sciences.  
Selected research techniques dealing primarily with  
solution culture, sterile tissue culture, hormone assay,  
ion uptake, osmotic relations, and photobiological  
reactions. Fee.

832 (734) G 3  
Advanced Plant Physiology: Metabolism  
A. 3 cr.  
Prereq.: 631, Biochem. 521, or Chem. 532.  
Advanced study of selected topics, mainy respiration,  
metabolic syntheses, absorption, and utilization of  
mineral salts, metabolism of growth substances,  
photosynthesis, and translocation.

833 (735) G 3  
Advanced Plant Physiology: Growth  
W. 3 cr.  
Prereq.: 631, 10 cr. hrs. Organic Chem. or Biochem.,  
and 10 additional cr. hrs. Biological Sciences.  
The physiology of growth and reproduction; special  
attention given to the interrelated effects of internal  
and external factors on these processes. Cline.

834 G 3  
Advanced Plant Physiology:  
Water and Solute Relations  
Sp. 3 cr.  
Prereq.: 630, 631, 10 cr. hrs. Organic Chem. or  
Biochem., and 10 additional cr. hrs. Biological Sciences.  
Osmotic relations, mechanisms of water and solute  
uptake and transport; salt metabolism, drought and  
salt tolerance. Swanson.

839 (820) G 1  
Seminar in Plant Physiology  
Prereq.: Permission of instructor.  
Repeatable to a maximum of 15 cr. hrs.  
Cline, Fratiianne, Meyer, and Swanson.

848 G 1  
Seminar in Plant Anatomy and Morphology  
Prereq.: Permission of instructor.  
Repeatable to a maximum of 10 cr. hrs.  
Discussions of theoretical and most current concepts  
in anatomy and morphology. Collins and Popham.

849† (830) G 2  
Seminar in Lichenology  
Sp. 2 cr.  
Prereq.: Permission of instructor.  
Repeatable to a maximum of 10 cr. hrs.  
Current problems of lichen symbiosis, morphology,  
taxonomy, ecology, and physiology. Rucolph.

860* (754) G 3  
Advanced Mycology  
Sp. 3 2-hr. lab.  
Prereq.: 660.  
Advanced detailed study of specific groups of fungi,  
with emphasis on their morphology, cytology, and  
genetics. Elliot, Rudolph, and Schmitt. Fee.

861* (718) G 5  
Physiology of Fungi  
W. 3 cr., 2 2-hr. lab.  
Prereq.: 631, 660, 10 cr. hrs. Organic Chem. or  
Biochem.  
The physiology of the nutrition, growth, and  
reproduction of fungi. Garraway and Larsen. Fee.
Groups of courses in Business Administration are:

- Accounting, see page 42
- Business Law 510, 611, 612, 613, 810
- Business Policy and Special Studies 493, 494, 693, 694, 799, 809, 995, 998
- Finance 521, 620, 621, 622, 623, 724, 725, 726, 727, 728, 820, 821, 822, 823, 826, 920, 929
- Insurance and Risk 640, 741, 743, 749, 840, 841, 843
- International Business 757, 857
- Management Processes 700, 701
- Manpower and Industrial Relations 660, 761, 762, 769, 860, 861, 862, 960, 961
- Marketing 650, 750, 751, 753, 754, 755, 756, 758, 850, 852, 854, 950, 951, 955, 959
- Organizational Behavior 301, 500, 708, 803, 804, 805, 911, 912, 913, 914, 915, 917, 918, 919
- Production and Operations Management 530, 731, 732, 734, 739, 830, 832, 834, 835, 930, 931
- Quantitative and Research Methods in Business 490, 601, 801.01, 801.02, 807
- Real Estate 670, 771, 772, 773, 870, 871, 873
- Transportation and Logistics 780, 781, 880, 889

220  (551)  U 3

Personal Finance
A, W, Sp.  3 cl.
Prereq.: 2nd yr. standing.
Not open to students in College of Administrative Science majoring in either Acc. or Finance.
Budgeting, credit, borrowing money, bank relationships, savings, insurance, real estate, stocks and bonds, income taxes, social security, annuities, wills, trusts, estates, and taxes. Donaldson, Pfahl, and Staff.

301  (510)  U 5

Secretarial Work
A.  5 cl.
Prereq.: Econ. 200, 201, or equiv.; and Ed. 207 and 209 or equiv.
Theory and practice of secretarial fundamentals; duties, responsibilities, procedures, and techniques of secretarial work. Hicks.

490  (615)  U 3

Industrial Statistics
Su, A, W, Sp.  3 cl.
Prereq.: Econ. 442 or equiv.
The application of statistical methods to the design and analysis of experiments, with a view to planning, organizing, and controlling the output of industry. Kindig.

493  U 2-5

Individual Studies
Prereq.: written permission of instructor.
Repeatable to a maximum of 30 cr. hrs.
Individual study projects in selected areas in business administration.

494  U 2-5

Group Studies
Prereq.: Written permission of instructor.
Repeatable to a maximum of 10 cr. hrs.
Group study projects in selected areas in business administration.
500 (676) U G 3
Principles of Management
Su, A, W, Sp. 3 cl.
Prereq.: Econ. 200, 201, 400, 402, or equiv.
An intensive examination of the basic fundamentals of organization and management underlying the solution of management problems. Close.

510 (621) U 4
Legal Environment of Business
Su, A, W, Sp. 4 cl.
Prereq.: 3rd yr. standing.
American legal institutions and sources of law; analysis of basic contractual concepts; aspects of corporation law and public law. Howell, Wilkins, and Gibson.

601† (614) U G 4
Business Statistics
W. 3 cl, 1 2-hr. lab.
Prereq.: Econ. 442 or equiv. or Soc. Work 380 or equiv.
Price and production indexes; analysis of time series; linear correlation applied to economic and business problems. Kindig.

611 (623) U G 3
Business Law: Agency and Partnerships
W. 3 cl.
Prereq.: 510 or equiv.
Legal principles and cases analyzed relating to representation of principals by agents, and to the formation, operation, and dissolution of partnerships. Howell.

612 (625) U G 3
Business Law: Commercial Paper and Sales
W, Sp. 3 cl.
Prereq.: 510 or equiv.
Analysis of cases and provisions of the Uniform Commercial Code relating to commercial paper, including checks and notes; sales of personal property and related transactions. Howell and Gibson.

613 (627) U G 3
Business Law: Corporations
A, W, Sp. 3 cl.
Prereq.: 510 or equiv.
Analysis of legal principles and cases governing the formation, operation, and dissolution of corporations. Wilkins.

620 (650) U G 4
Corporate Finance
Su, A, W, Sp. 2 2-hr. cl.
HECO (honors) may be available to students enrolled in a college honors program or by permission of faculty.
Prereq.: Econ. 200, 201, 400, 402, or equiv.; and Acc. 201, 212, or equiv.
Forms of business organization; corporate securities, financing through securities; sources and management of working capital; administration of income; expansion and combination; reorganization, receivership, and dissolution. Pfahl, Foster, and Staff.

630 (677) U G 4
Introduction to Production and Operations Management
Su, A, W, Sp. 4 cl.
HECO (honors) may be available to students enrolled in a college honors program or by permission of faculty.
Prereq.: 490 or equiv.
Topics and problems in managing and controlling systems including demand-capacity relationships, product factors, physical factors, process factors, and system maintenance. Hardy.

640 (618) U G 4
Insurance and Risk
A, W, Sp. 2 2-hr. cl.
Prereq.: Econ. 200, 201, 400, 402, or equiv.
Principles and practices of insurance and risk management, including personal, business, and social viewpoints in regard to insurance for life, health, property, and liability risks. Bickelhaupt and Close.

650 (700) U G 4
Marketing
Su, A, W, Sp. 4 cl.
HECO (honors) may be available to students enrolled in a college honors program or by permission of faculty.
Prereq.: Econ. 200, 201, 400, 402, or equiv.
Critical survey of field of marketing; structure, functions, policies, costs, and problems analyzed from consumer and other viewpoints; emphasis on principles, trends, and quantitative expression. Davidson, Doody, and Staff.

660 (686) U G 3
Introduction to Manpower and Industrial Relations
Su, A, W, Sp. 3 cl.
Prereq.: Econ. 400, 402, or equiv.
Principles and practices of recruiting, selecting, developing, collective bargaining, compensation, and utilizing effective manpower resources. Close.

670 (642) U G 4
Real Estate and Urban Land Economics
A, W, Sp. 2 2-hr. cl.
Prereq.: Econ. 200, 201, 400, 402, or equiv.
Introduction to investment decision making in land resource utilization; consideration of factors such as real estate markets, public influence, legal principles, financing, and administration. Rascher and Smith.

693 (799) U G 2-5
Individual Studies
Prereq.: Written permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Individual study projects in related areas in business administration.

694 U G 2-5
Group Studies
Prereq.: Written permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Group study projects in selected areas in business administration.
700  U G 5  Management Processes: Planning and Controlling  
Su, A, W, Sp.  5 cl.  
Prereq.: 490, 620, 630, 650 or equiv.  
Business goals and policies; phases of decision making; analysis of alternatives; establishing, evaluating, and controlling plans of action.

701  U G 5  Management Processes: Organizing  
Su, A, W, Sp.  5 cl.  
Prereq.: 490, 620, 630, 650 or equiv.  
Establishing, maintaining, and controlling resources to accomplish business objectives; authority and responsibility relationships; formal and informal organizational arrangements; structure of business systems and procedures. Bobbitt.

708  U G 3  Introduction to Administrative Behavior  
Su,  2 1/2-hr. cl.  
Prereq.: Permission of instructor.  
Open only to students preparing for grad. work in administration.  
Introduction to behavioral concepts of concern to management. Engel and Yanev.

720  (730)  U G 3  Corporation Finance  
A, W, Sp.  2 1/2-hr. cl.  
Prereq.: Acc. 201, 212, or equiv.; and Econ. 200, 201, 400, 402, or equiv.  
Open only to students preparing for grad. work in business.  
A critical study of the field of corporation finance from an economic point of view. Pfahl, Mullins, and Staff.

721  (651)  U G 3  Managerial Finance  
Su, A, W, Sp.  3 cl.  
Prereq.: 620 or equiv.  
Financial management of business units with emphasis on finance organization structure, collecting and using financial data, judging profitability, liquidity, sources of capital, internal financial operations. Foster, Mullins, and Staff.

722  (655)  U G 3  Investment Management  
Su, A, W, Sp.  3 cl.  
Prereq.: 620 or equiv.  
Investment objectives; types of investments and their relative merits; security prices and yields; investment programs; and taxes. Stone, Harvey, and Staff.

723  (657)  U G 3  Investment Analysis  
W, Sp.  3 cl.  
Prereq.: 722 or equiv.  
Methods of investment analysis; analysis of investment data; principles and standards for selection of specific investments; portfolio management. Harvey and Stone.

724  (660)  U G 3  The Stock Market  
A, Sp.  3 cl.  
Prereq.: 620 or equiv.  
Practices, procedures, and regulations relating to listing and to buying and selling securities in the organized security markets. Donaldson.

726  (674)  U G 3  Financial Institutions  
A, W, Sp.  3 cl.  
Prereq.: 620 and Econ. 520 or equiv.  
Structure, operations, regulation, and economic significance of financial institutions with emphasis on savings, trust, mortgage lending, consumer lending, regulatory, and investment banking institutions. Rapp, Cole, and Staff.

727  (670)  U G 3  Management of Financial Institutions  
Sp.  2 1/2-hr. cl.  
Prereq.: 725 or equiv.  
Examination of the objectives, functions, policies, organization, practices, and procedures of financial institutions from the viewpoint of the institutional management. Cole and Rapp.

729  (652)  U G 3  Cases in Managerial Finance  
A, W, Sp.  2 1/2-hr. cl.  
Prereq.: 721 or equiv.  
Analysis of qualitative and quantitative financial factors involved in managerial decisions in actual business cases. Rapp, Cole, and Staff.

730  U G 3  Fundamentals of Production and Operations Management  
A, Sp.  3 cl.  
Prereq.: 490 or equiv. or permission of instructor.  
Open only to students preparing for grad. work in business.  
Topics and problems in managing the production and operational systems in various types of organizations; consideration of managerial and economic implications. Krajewski.

731  (685)  U G 4  Production and Operations Management I  
Su, A, W, Sp.  4 cl.  
Prereq.: 630, 700, and 701.  
Analysis of capacity related problems, including forecasting, capital investments, product selection and design, maintenance, plant location, materials handling, and facilities design. Hardy.

732  (687)  U G 4  Production and Operations Management II  
Su, A, W, Sp.  4 cl.  
Prereq.: 731 or permission of instructor.  
Analysis of operating and control problems, including aggregate planning, scheduling, inventory control, quality assurance, work measurement, and cost analysis. Vitt.
734 (691) UG 3
Analysis and Design of Operating Systems
W. 3 cl.
Prereq.: A course in computer programming or permission of instructor.
Analysis and design of modern production planning and control systems, including model building and computer simulation. Vitt.

739 (698) UG 3
Problems in Production and Operations Management
A, Sp. 3 cl.
Prereq.: 731, 732, or permission of instructor.
Case study approach to problem-solving and decision-making for production and operations management. Abramowitz.

741 (760) UG 4
Personal Insurance Planning
A. 2-hr. cl.
Prereq.: 640 or equiv.
Analysis of personal consumer needs for life, health, property, and liability insurance; development of contracts, legal aspects, rates, and the technique of estate programming. Bickelhaupt and Close.

743 (761) UG 4
Insurance Operations and Regulations
W. 2-hr. cl.
Prereq.: 640 or equiv.
Examination of the major functions of insurers of all types; product development, underwriting, rating, reinsurance, marketing systems, loss payment, financial analysis, management, and regulation. Bickelhaupt and Bobbitt.

749 (764) UG 4
Business Risk Management
Sp. 2-hr. cl.
Prereq.: 640 or equiv.
Development of insurance and risk management programs for business consumers; risk identification, evaluation and treatment; all lines, including group insurance, business life insurance and pensions. Bickelhaupt and Bobbitt.

750 (729) UG 3
Marketing
Su, A, W. 3 cl.
Prereq.: Permission of instructor.
Open only to students preparing for graduate work in business.
A critical study of the field of marketing institutions and functions primarily from a social point of view. J. H. Davis, Doody, and Grabner.

751 (702) UG 6
Managerial Marketing
Su, A, W, Sp. 3 2-hr. cl.
Prereq.: 700 and 701 or equiv.
Marketing policies and strategy; organization, demand analysis, product planning, pricing, physical distribution, selling, advertising, sales promotion, and credit from a managerial viewpoint. J. H. Davis, Stern, and Talarzyk.

753 (705) UG 4
Retailing
A, W, Sp. 4 cl.
Prereq.: 650 or equiv.
Principles and methods of management as applying to retailing, including location, organization, personnel, buying, inventory control, selling and advertising, services, expenses, and profits. Davidson, Doody, and Kollat.

754 (706) UG 4
Wholesaling
A, Sp. 4 cl.
Prereq.: 650 or equiv.
Nature, history, institutional compositions, competitive factors, economic and government aspects; scientific management of wholesale establishments, including functions of sales, internal operations, and operating expense control. J. H. Davis.

755 (716) UG 4
Principles of Advertising
A, W, Sp. 4 cl.
Prereq.: 650 or equiv.
Management of advertising by clients and agencies; budgeting, research, media selection, preparation of advertisements, economic and social effects of advertising. Engel, Blackwell, and Kollat.

756 (709) UG 4
Credits and Collections
A, W. 4 cl.
Prereq.: 650 or equiv.
Nature, instruments, and place of credit in the economy; management of consumer, mercantile, and bank credit; analysis of credit risk; management of collections; credit control. Bartels and Miner.

757 (720) UG 4
International Marketing
A, Sp. 4 cl.
Prereq.: 650 or equiv.

758 (704) UG 4
Marketing Research
A, Sp. 4 cl.
Prereq.: 650 and Econ. 442 or equiv.
The role of research in the solution of marketing problems; emphasis on available data analysis and methods of the field of investigation. Miner, Engel, and Blackwell.

761 (695) UG 3
Industrial Relations Administration
A, Sp. 3 cl.
Prereq.: 660 or equiv.
Examination of the process of accommodation and rule-making among management, employers, and government relative to their respective goals and strategies, and pertinent legislation and environmental constraints. Miljus.
762 (693) U G 3
Compensation Administration
A, W. 3 cl.
Prereq.: 660 or equiv.
Managerial and organizational aspects of compensation principles and practices for administrative, operative, and staff employees and in various functional fields. Yaney.

769 (692) U G 3
Problems in Manpower and Industrial Relations
Sp. 3 cl.
Prereq.: 761 and 762 or equiv.
Problems and case histories are utilized to develop proficiency in applying principles and developing decision-making powers in regard to manpower and human relations areas. Behling.

771 (647) U G 3
Real Estate Administration
Sp. 2 1/2-hr. cl.
Prereq.: 670 or equiv.
Administration of real estate business in the performance of economic functions; the managerial aspects of brokerage, development, construction, property management, and financial firms. Racster and Smith.

772 (643) U G 3
Real Estate Finance
A. 2 1/2-hr. cl.
Prereq.: 670 or equiv.
Sources and methods of obtaining funds for real estate investment; financial institutions, legal considerations, the construction industry and cycles, and financing policies, practices and experiences. Smith and Racster.

773 (646) U G 3
Real Estate Valuation
W. 2 1/2-hr. cl.
Prereq.: 670 or equiv.
Professional valuation as a guide to business decisions; valuation theory and procedures; factors influencing real estate values, and the selection and analysis of data. Smith and Racster.

780 (750) U G 4
Micro-Logistics
A. 4 cl.
Prereq.: 700.
Management of logistics activities of the firm from the viewpoint of both the provider and user of logistics system components. Grabner and Robeson.

781 U G 4
Analysis and Design of Logistics Systems
Sp. 2 2-hr. cl.
Prereq.: 780 and Econ. 576.
Analysis of internal and environmental factors affecting logistics systems and the effect of such factors on the development and implementation of integrated logistics systems.

799 U G 4
Business Policy
Su, A, W, Sp. 4 cl.
Prereq.: Approved application for B. S. in Business Administration.
Analysis of major policy decisions in the context of the entire philosophical framework of business; emphasis on consideration of interrelationships of major functions of business. Doody, Foster, and Staff.

801 (802) G 3
Quantitative Methods in Business
Su, A, W, Sp. 3 cl.
Prereq.: Math 123 or equiv. and Econ. 442 or equiv.
Derivation and application of analytical, mathematical, and statistical techniques to the solution of recurring management problems.

801.01 Deterministic
Bartos.

801.02 Stochastic
Kindig.

802 G 3
Business Research Organization and Methodology
A, Sp. 3 cl.
Prereq.: Permission of instructor.
Repeatable to a maximum of 12 cr. hrs.
Selection, definition, organization, development, and presentation of an individual research project.

803 (840) G 3
Formal Organization Theory
Su, A, Sp.
Prereq.: 708 or placement examination.
An introduction to the various sociological and psychological theories which underlie the concept of the formal organization. McNaul.

804 G 3
Advanced Topics in Organization Theory
W. 1 3-hr. cl.
Prereq.: 803 and 860.
A continuation of 860 designed for students interested in treating organization concepts in more depth as they pertain to modern business groups. Bobbitt.

805 G 3
Introduction to Administrative Systems
Sp. 1 3-hr. cl.
Prereq.: 803 and 860.
The organization of an administrative system; types of systems and the problems involved. Hiccs.

807 (800) G 3
Principles and Techniques of Research
A, Sp.
Prereq.: 801.02
Not open to students with credit for 800.
Principles of research methods in business and the use of research by management; scientific method in business, sampling theory, variable analysis, research cases. Engel and Blackwell.
809  (841)  G 5
Business Policy
Su, A, W, Sp.  2 2-hr. cl.
Prereq.: Final yr of M.B.A. studies or permission of graduate committee.
Examination of fundamental factors in organization and management; analysis of major policy decisions; effects of policy decisions on sales, production, personnel, and finances. Cullman, Davidson, and Staff.

810  G 3
Government Regulation and Business Decisions
Sp.  2 11/2-hr. cl.
Prereq.: 510 or equiv.
Analysis of methods utilized by government to regulate business and maintain competition, emphasizing the impact of administrative and judicial interpretation upon managerial decisions. Howell and Gibson.

820  (803)  G 3
Advanced Finance
Su, W, Sp.  2 11/2-hr. cl.
Prereq.: 720, Acc. 811 or equiv.
a critical study of internal financial management of business enterprises, based primarily on comprehensive case analyses. Foster, Mullins, and Staff.

821  G 3
Seminar in Corporate Financial Analysis
W.  2 11/2-hr. cl.
Prereq.: 820.
critical study of the growing number of analytical techniques and research findings that lie between present practices and the frontiers of financial research. Mullins and Foster.

822  (827)  G 3
The Security Market
Su.  2 11/2-hr. cl.
Prereq.: Permission of instructor.
a critical study of the markets for listed and unlisted securities and the factors influencing security prices. Stone.

823  G 3
Quantitative Methods in Investment Management
A.  2 11/2-hr. cl.
Prereq.: 722 or 822 and 801.02 or equiv. or permission of instructor.
Recent developments in quantitative methods applied to investment analysis and portfolio management including the Markowitz portfolio model, random walk hypothesis, utility in risk analysis and valuation models. Harvey.

825  G 3
Seminar in Financial Institutions
Sp.  2 11/2-hr. cl.
Prereq.: 726 and 820 or permission of instructor.
Review, analysis, and evaluation of pertinent literature and research findings related to financial institutions. Cole and Rapp.

830  G 3
Advanced Operations Management
Su, W, Sp.
Prereq.: 730 or equiv., and 801.01.
A critical survey and examination of the current trends and advanced problems in production and operations management, including analysis and policy formulation. Ritzman.

832  (836)  G 3
Design of Operating Systems
Sp.
Prereq.: 734 or permission of instructor.
a study of problems in the development of operations and operations management, systems design, and operational control processes. Vitt.

834  G 3
Advanced Topics in Capacity Planning
Sp.  2 11/2-hr. cl.
Prereq.: 830 and 801.02.
a study of current research and mathematical models for selected capacity topics which may include capital input selection, capacity maintenance, facility design, or location assessments. Fitzman.

835  G 3
Advanced Topics in Operations Analysis
A.  2 11/2-hr. cl.
Prereq.: 830 and 801.02.
Extensive applications of management science techniques for selected topics which may include aggregate planning, production sequencing, inventory theory, or cost analysis. Krajewski.

840  (829)  G 3
Seminar in Life and Health Insurance
W.  1 2-hr. cl.
Critical consideration of current topics of significance in the field of life and health insurance through class discussions and individual research reports. Bickelhaupt and Close.

841  (836)  G 3
Seminar in Property and Liability Insurance
Sp.  1 2-hr. cl.
Investigation through class discussion and reports of the current literature on significant topics in property and liability insurance. Bickelhaupt and Close.

843  G 3
Risk Analysis and Administration
W.  2 11/2-hr. cl.
Prereq.: Permission of instructor.
a comprehensive view of general nonspeculative risk problems as well as specific problems in the students’ areas of concentration with emphasis on insurance as a tool. Bickelhaupt and Close.

850  (813)  G 3
Advanced Marketing
Su, A, W.
Prereq.: 801.02.
a critical study of management of marketing activities in business enterprises, based primarily on comprehensive case analyses. J. H. Davis, Kollat, and Stern.
852  (818)  G 1-3
Seminar in Specialized Areas of Marketing
Prereq.: 650 or equiv.
Repeatable.
Regular class meetings and group discussions of the
subject matter embodied by one of the following areas
in the field of marketing:
Include decimal with number on schedule card.
852.01 Advertising
852.02 Credits and Collections
852.03 Marketing Research
852.04 Retailing
852.05 Sales Management
852.06 Wholesaling
852.07 Marketing Theory
852.08 Logistics

854  G 3
Consumer Behavior
A, W.  2 1/2-hr. cl.
Prereq.: 850 or permission of instructor.
Development of the consumer decision process and its
application to marketing strategy decisions. Blackwell,
Engel, and Kollat.

857  G 3
Multinational Business Administration
W.  2 1/2-hr. cl.
Prereq.: 757 or equiv.
Application of administrative principles to business
institutions which are franchised, owned, financed,
managed, staffed, or operated in two or more countries.
Bartels.

860  (838)  G 3
Administration of Interpersonal Behavior
Prereq.: 708 or placement examination.
Analysis of interpersonal relations, manpower programs
and policies, communication practices, and morale
factors relative to the effect upon productivity,
organizational effectiveness, and personal systems.
Militus.

861  G 3
Seminar in Industrial Relations Administration
Su.  1 3-hr. cl.
Prereq.: 761 or equiv.
Interaction and accommodation processes between
institutionalized collective groups of employees and
managers of goal oriented organizations located in both
the private and public sectors of society. Yaney,
Behling.

862  G 3
Problems in Manpower Administration
W.  1 3-hr. cl.
Prereq.: 860 or equiv.
Theory and problems involved in selecting, developing,
retaining, motivating, utilizing, and allocating
manpower resources within complex organizations.
Behling.

870  (749)  G 3
Seminar in Real Estate
W.  1 3-hr. cl.
Prereq.: 670 plus one of the following: 771, 772, 773, or
equiv.
Issues and problems in the economics and
administration of real estate resources critically
examined through an intensive investigation of the
literature. Smith and Racster.

871  G 3
The Urban Environment
Su.  1 3-hr. cl.
Prereq.: Permission of instructor.
Urban problems and the business man's role in solving
them through study of the history of urbanization,
functions of urban areas, and community involvement
by private and public agencies. Hunker and Racster.

873  G 3
Urban Real Estate Analysis
A.  1 3-hr. cl.
Prereq.: Permission of instructor.
The process of analysis and the tools employed in
making decisions about the planning, financing,
marketing, rehabilitation, and production of real estate
resources. Smith and Racster.

880  (812)  G 3
Physical Distribution Management
A.
Prereq.: 630, 650, Econ. 442 or equiv.
Management of movement services and coordination of
demand and supply patterns for optimization of
physical systems in terms of cost and customer service.
Grabin and Robeson.

889  (845)  G 3
Theory of Business Logistics
Sp.
Prereq.: Permission of instructor.
Critical examination of various theories of the structure
and operation of logistics systems; research
methodology for testing logistics theory and the
application of logistics theory to contemporary
logistics problems. Lalonde.

889  G 1-5
Interdepartmental Seminar
(See under Interdepartmental Seminars.)

911  G 3
Concepts in Organization and Management
W, Sp.  2 1/4-hr. cl.
Prereq.: 800.
Research and theoretical advances in various aspects
of social organization and behavior as they relate to
the management of the complex organization. McNaul.

912  G 3
Analysis of Organization Theory
Sp.  1 3-hr. cl.
Prereq.: Permission of instructor.
Not open to students with credit for 903.
Analysis and comparison of recent theories of
organization; their integration with older theories.
Stogdill.


Advanced Topics in the Management of Individual Behavior in Formal Organizations
A. 2 3/4-hr. cl.  
Prereq.: 805 and 860.  
Treats constructs and results drawn from disciplines including psychology, anthropology, information science, and behavioral zoology as applied to motivation and decision-making in formal organizations. Bobbitt.

Work Groups in the Organizational Setting
W. 2 3/4-hr. cl.  
Prereq.: 803 and 860.  
Theory and research on formal and informal structures in work groups and their influence on productivity and management. Stogdill.

Management of Formal Organizations
Sp. 2 1/4-hr. cl.  
Prereq.: 803 and 860.  
Theory and research on the structural characteristics of formal organizations with particular emphasis on the management of the organization as a dynamic system. Hicks.

Seminar in Integrative Management Theory
A.  
Prereq.: 803, 860, or equiv., or permission of instructor. Not open to students with credit for 900. 
The administrative process and the factors and forces within an organization which impinge upon it and affect decision-making. Powell.

Seminar in Integrative Management Research
W.  
Prereq.: 917 or permission of instructor. Not open to students with credit for 901. 
A continuation of the general subject matter of 917, focusing upon the manner in which the socio-cultural milieu influences organizational action.

History of Management Thought
Sp.  
Prereq.: 911 or permission of instructor. Not open to students with credit for 900. Seminar in the historical evolution of fundamental concepts underlying the theory and practice of modern management; discussion of pioneers in the management fields. Powell.

Seminar in Finance
W. 1 2-hr. cl.  
Prereq.: 820 or equiv. 
A critical study of current practices, trends, and problems in the field of finance. Pfahl and Foster.

Industrial Consolidations and Mergers
Sp. 1 2-hr. cl.  
Prereq.: 820 or equiv. 
A historical and analytical study of industrial consolidation and mergers. Stone.

Seminar in Production and Operations Management
A.  
Prereq.: 830 or equiv. A critical analysis of research and emerging theories in the field with emphasis on their social, economic, and physical implications. Abramowitz.

Seminar in Production and Operations Management
W.  
Prereq.: 930 or equiv. 
A continuation of 930 including research methodology and the development of a research proposal. Abramowitz.

Seminar in General Marketing
A.  
Prereq.: 650 or equiv. 
A critical study of fundamental principles of marketing; special emphasis on the historical, macro, social, and theoretical aspects of the subject. Davidson.

Seminar in General Marketing
W.  
Prereq.: 950 or equiv. 
Continuation of 950. Miner.

Seminar in Contemporary Marketing Problems
Sp.  
Prereq.: 650 or equiv. 
Repeatable to a maximum of 6 cr. hrs. Review of current periodical literature and individual investigation by each student of a selected marketing problem of contemporary significance for seminar discussion and written report. Bartels, J. H. Devir, Davidson, and Miner.

History of Marketing Thought
A.  
Prereq.: 650 or equiv. and permission of instructor. Evolution of marketing; concepts, terminology, principles, and theory; environmental and personal influences; analysis of marketing literature; marketing thought related to other social sciences. Bartels.

Seminar in Manpower and Industrial Relations Thought
A.  
Prereq.: 860 and permission of instructor. A consideration of manpower and industrial relations thought in terms of its historical and theoretical evaluation. Miljus.
Seminar In Manpower
and Industrial Relations Research
W.
Prereq.: 880 and permission of instructor.
A consideration of relevant manpower research and
methodology, and individual development of research
projects. Behling and Milijus.

Research in Business Administration: Thesis
Su, A. W. Sp.
Research for thesis purposes only.

Research in Business Administration:
Dissertation
Su, A. W. Sp.
Research for dissertation purposes only.

Ceramic Engineering
Office: 177 Watts Hall, 2041 North College Road.

Professors Everhart (Chairman), Blau (Emeritus), R. King (Emeritus), Koenig, Metzger, and Russell; Adjunct Professor Hicks; Associate Professors Campbell, B. King, and Shook; Adjunct Assistant Professor Alexander.

Introduction to Ceramic Engineering
A. 3 cl.
Introductory course for ceramic engineering students and a survey of ceramic products, their testing, and their uses for students in disciplines other than ceramic engineering. Metzger.

Fundamentals of Ceramic Engineering I: Materials
W. 3 cl.
Survey of raw materials, their properties, functions, thermal behavior, and applications; introduction to the concept of glassy and crystalline states. Russell.

Fundamentals of Ceramic Engineering II: Processing
Sp. 2 cl., 1 3-hr. lab.
Prereq.: 201.
Preparation of ceramic materials and measurement and control of the principal process parameters, with emphasis on the relationship between structure, properties, and production economics. Shook.

Heat Processes I
A. 3 cl.
Prereq.: 424.
Fuel sources and economy in ceramic drying, firing, or melting; heat release and utilization, temperature measurements and control. Shook.

Heat Processes II
Sp. 3 cl., 1 3-hr. lab.
Prereq.: 425; concur. 552.
Psychrometry in drying operations and dryer calculations; reactions of ceramic products during drying and firing; melting and crystallization control. Shook.

Inspection Trip
Su, A, W, Sp. 6 approved plant visits.
Visits to a variety of modern ceramic operations as arranged by the department throughout the academic year.

Thermodynamics of Ceramic Materials
A. 3 cl.
Prereq.: Chem. 533.
Applications of thermodynamics to ceramic systems, including non-stoichiometry and interfacial relationships. Alexander.

Ceramic Rate Processes
W. 3 cl.
Prereq.: 510 or equiv., and Chem. 521.
Introduction to chemical kinetics and rate processes of ceramic materials with emphasis on interrelation of heat transfer and reaction rate. Campbell.

Ceramic Materials Science II
A. 4 cl.
Prereq.: 611.
Not open to students with credit for 612 or 613.
Structural imperfections and atomic mobility at high temperatures; development of ceramic microstructure; mechanical, optical, and electrical properties with heat treatment. Shook.

Ceramic Process and Product Control
Sp. 4 cl.
Prereq.: 422.
The application of control methods for processes and products. Everhart.

Ceramic Characterization I
W. 4 cl.
Prereq.: 510.
Application of analytical techniques and concepts including the analysis of structures, phases, and particulate matter by microscopic, diffractive, spectroscopic, chemical, and other approaches. Russell.
552† U G 3
Ceramic Characterization II
Sp. 3 cr.
Con: Dr. P. G. Wendt.
Analytical measurements of ceramic material thermal responses, including adiabatic and dynamic calorimetry, thermogravimetric analysis, effluent gas measurements and conventional DTA. Campbell.

589 (430) U 5
Industrial Experience
Repeatable to a maximum of 10 cr. hrs.
Ten weeks practical experience or its equivalent, including written report, in approved factory manufacturing ceramic wares.

611 (715) U G 4
Ceramic Materials Science I
A. 4 cr.
Prereq.: Chem. 521 or 533.
Structure of crystals, crystal chemistry and physics, chemical bonds and atomic coordination, inorganic, non-metallic materials; silicate and defect structures emphasized. Hicks.

612† U G 4
Advanced Ceramic Materials Science I
A. 4 cr.
Prereq. or concur.: 510 or equiv.
Materials science in the areas of crystal and surface chemistry, colloids, rheology of plastic and solid states, and thermal and optical properties. King.

613† U G 4
Advanced Ceramic Materials Science II
W. 4 cr.
Prereq.: 510 or equiv.
Materials science in areas of defect structures and atomic mobility, sintering and vitrification kinetics; development of ceramic microstructure, dielectric, ferroelectric, magnetic, and mechanical properties. Shook.

621 (740) U G 5
Ceramic Plant Design
Sp. 4 cr., 1 2-hr. lab.
The concepts of ceramic plant layout with regard to processing equipment, project planning and updating techniques. Shook.

631 (731) U G 4
Glass Science and Technology
Sp. 3 cr., 1 3-hr. lab.
Prereq.: 611.
Structure and properties of glasses considered as undercooled liquids with emphasis on commercially important compositions. Hicks.

632 (732) U G 4
Ceramic Technology
W. 2 cr., 2 3-hr. lab.
The technology of porcelain enamels and surface coatings for metals. King.

633 (733) U G 4
Ceramic Technology
Sp. 2 cr., 2 3-hr. lab.
The technology of refractories, structural clay products, and abrasives. Stetzer.

634 (734) U G 4
Ceramic Technology
A. 2 cr., 2 3-hr. lab.
The technology of fine textured ceramics in the area of whitewares, electrical, technical and nuclear materials, and glaze coatings. Russell.

671 U G 3
Bioceramics
Sp. 2 cr., 1 3-hr. lab.
Prereq.: Elec. E. 670 or permission of instructor.
Evaluation and characterization of ceramic materials for medical applications. Campbell.

693 (750) U G 1-7
Individual Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Ceramic investigations in areas of advanced non-thesis research.

694 U G 1-6
Group Studies in Ceramic Engineering
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.

711 (715) U G 4
Ceramic Materials Science II
W. 4 cr.
Prereq.: 611.
Combinations of the glassy and crystalline states; heterogeneous crystal systems; interfacial conditions, internal stress states, interstate bonds, and micro and macro structure. Shook.

712 (781) U G 4
Advanced Ceramic Materials Science I
A. 4 cr.
Prereq.: 711 or permission of instructor.
Materials science in the areas of crystal chemistry, colloids, surface phenomena, and rheology of plastic and solid states; thermal and optical properties. King.

713 (782) U G 4
Advanced Ceramic Materials Science II
A. 4 cr.
Prereq.: 711.
Defect structures, diffusion, and electrical conductivity; solid state reactions, nucleation and growth in ceramic systems; ceramic microstructure. Shook.
715 **UG 3**
Thermoanalytical Techniques
A. 2 cl, 1 3-hr. lab.
Prereq.: Permission of instructor.
Differential thermal analysis, thermogravimetric analysis and dynamic differential calorimetry of changes of state and reactions including mathematical and graphical data reduction. Campbell.

741 **UG 3**
The Chemistry and Chemical Processes of Glass Technology
A. 3 cl.
Prereq.: 611 and 631.
The practical processes and equipment for producing commercial molten glasses, including the selection and handling of materials, charging, processes in the furnace, types of furnaces, furnace design, and operation. Koening.

742 **UG 4**
Glass Technology
W. 4 cl.
Prereq.: 741 or permission of instructor.
Machine processes for forming pressed, blown, and flatware; annealing, tempering and decorating; plant visits to observe current commercial practice.

785 **UG 3**
Ceramic Research Methods
A. 1 cl, 6 lab. hrs.
Prereq.: 711.
Introduction to research experience; organization and planning; initiating specific research, designed in combination with 786 to give experience in individual and group research. Campbell and Staff.

786 **UG 3**
Ceramic Research Methods
W. 9 lab. hrs.
Prereq.: 785.
Continuation of 785 with accent on the conduct of specific research problems.

790 **UG 3**
Ceramic Case Histories
Sp. 3 cl.
The study of selected case histories in ceramic technological and industrial problems; designed to give experience in individual and group thinking in problem solution. Everhart.

791 **UG 3**
Ceramic Case Histories
Sp. 3 cl.
The study of selected case histories in ceramic technological and industrial problems designed to give experience in individual and group thinking in problem solution. Russell.

852 **G 3**
Advanced Physics and Chemistry of Glasses
Sp. 2 cl.
Prereq.: 631, or permission of instructor.
Glass structure related to composition and liquid structure, equilibrium atomic configurations, energy relationships, kinetics of crystallization, and controlled devitrification in theory and in practice. Hicks.

853 **G 4**
Advanced Ceramic Physics and Chemistry
W. 4 cl.
Prereq.: Permission of instructor.
Reactions between solid phases, including sintering; the application of phase equilibria to ceramic problems; oxide ceramics and thermodynamics. Alexander.

854 **G 4**
Advanced Ceramic Physics and Chemistry
Sp. 4 cl.
Prereq.: Permission of instructor.
Special properties of crystals; organic chemistry, ultrasonics, and thermodynamics applied to ceramics; nonoxide ceramics. Alexander.

855 **G 4**
Advanced Ceramic Science
W. 4 cl. or conf.
Prereq.: 711 or equiv.
Modern engineering materials from the viewpoint of ceramic science, and solid state physics; consideration of electrical and mechanical phenomena related to technical ceramics behavior. Russell.

856 **G 4**
Advanced Ceramic Science
Sp. 4 cl. or conf.
Prereq.: 711 or equiv.
Modern engineering materials from the viewpoint of ceramic science; thermal behavior, ceramic-metal systems, sandwich and fiber composites, space material problems, plasma and vapor deposition technology. King.

889 **G 1 or 2**
Seminar in Ceramic Engineering
Prereq.: Permission of instructor.
Repeatable to a maximum of 6 cr. hrs.
Conference and reports on problems in ceramic science, technology and engineering; topics chosen to cover the development of the ceramic industry.

993 **G 1-6**
Individual Studies
Repeatable to a maximum of 6 cr. hrs.

994 **G 1-6**
Group Studies
Repeatable to a maximum of 6 cr. hrs.

999 **G Arr.**
Research in Ceramic Engineering
Research for thesis or dissertation purposes only.
Chemical Engineering

Office: 121 Chemical Engineering Building, 140 West 10th Avenue

Professors Syverson (Chairman), Brochey, Freeth, Geankoplis, Kay, Koffolt, and Smith; Associate Professors Lynn (ALCOA), Sheets, Slider, and Sweeney; Adjunct Associate Professors Bates, Eckert, and Martin; Assistant Professors Heiber, Hershey, Svans, and Wilhelm.

400 (593) U 3
Chemical Engineering and Process Calculations
A, W. 2 cl., 2 comp. lab. hrs.
Prereq. or concurs.: Physics 131, Math. 152, and Chem. 152 or 205 or equiv.; or permission of instructor.
The application of physico-chemical principles to problems of the chemical industry; emphasis on graphical method, stoichiometry, heat, and material balances. Geankoplis, Haering, Koffolt, and Smith.

401 (594) U 3
Chemical Engineering and Process Calculations
W, Sp. 2 cl., 2 comp. lab. hrs.
Prereq.: 400.
Continuation of 400.

422 (594) U 3
Petroleum Geophysical and Drilling Methods
W. 1 cl., 2 3-hr. lab.
Prereq.: Physics 113 or 133 and Math. 153 or (537); or equiv.
Not open to students with credit in Petr. E. 442 (602).
Engineering aspects of geophysical exploration and drilling for gas and oil; emphasis on rotary drilling. Slider.

489 (501) U 5
Chemical Engineering Practice Work
A. 10 weeks approved work experience.
Prereq.: Chem. E. 3rd yr. standing.
The equivalent of ten weeks spent in a factory, or the engineering department of an industrial plant, or organized industrial work between 3rd and 4th year in Chemical Engineering. Koffolt.

520 (691) U G 3
Elements of Chemical Engineering—Transport Phenomena I
A, Sp. 2 cl., 2 comp. lab. hrs.
Prereq. or concurs.: 401, Math. 255, and Physics 132; or permission of instructor.
Introduction to momentum, mass, and heat transfer with emphasis on the analogies between the transport; numerous computation problems illustrate applications to chemical engineering practice. Brochey.

521 (692) U G 3
Elements of Chemical Engineering—Transport Phenomena II
A, W. 2 cl., 2 comp. lab. hrs.
Prereq.: 520, Math. 255, and concurs. Math. 512; or permission of instructor.
Continuation of transport theory and introduction to radiation as applied to heat transfer; basic principles developed and illustrated with problems from chemical engineering practice. Hershey and Sweeney.

542 U G 3
Drilling Fluids
W. 1 cl., 2 3-hr. lab.
Prereq.: 442.
Not open to students with credit in Petr. E. 542 (713).
Significance and control of drilling fluid qualities; commercial drilling fluids analyzed in the laboratory and the control of their properties demonstrated. Slider.

543 U G 2
Physical Analysis of Petroleum Reservoirs
W. 1 cl., 1 4-hr. lab.
Prereq.: 442 or permission of instructor.
Not open to students with credit in Petr. E. 543 (723).
Quantitative study of the physical nature of a petroleum reservoir; includes laboratory analysis of porosity, permeability, saturation, capillary pressure, and multiphase characteristics of reservoir rocks. Slider.

544 U G 3
Oil and Gas Well Completions
A. 3 cl.
Prereq.: 542 and 642.
Not open to students with credit in Petr. E. 544 (737).
Design of well completion methods emphasizing reservoir damage and evaluation of reservoir conditions, casing design, cementing, logging, acidizing, and hydraulic fracturing. Slider.

608 (753) U G 3
Chemical Engineering Thermodynamics
W. 2 cl., 2 comp. lab. hrs.
Prereq.: 401 and Math. 512.
Application of the fundamental concepts and laws of thermodynamics to problems of the chemical industry; stress on computational problem work. Kay.

609 (754) U G 3
Chemical Engineering Thermodynamics
Sp. 2 cl., 2 comp. lab. hrs.
Prereq.: 608.
Continuation of 608.

610 (755) U G 3
Chemical Engineering Kinetics
A, Sp. 2 cl., 2 comp. lab. hrs.
Prereq.: 609, 612, and Chem. 531.
Chemical and engineering principles for the design and operation of chemical reactors; kinetics of simple homogeneous systems and introduction to heterogeneous catalysis. Syverson.

611 (719) U G 3
Elements of Chemical Engineering—Transport Phenomena III
Prereq.: 521 or equiv., or permission of instructor.
Continuation of the study of transport theory; emphasis on mass transfer and stagewise operations with applied computational problems. Geankoplis and Hershey.
Chemical Engineering Operations
W, Sp. 3 cl., 2 comp. lab. hrs.
Prereq. or concur.: 611. Chem. 532 or permission of instructor.
The application of the transport phenomena as fluids, heat, and mass transfer to the chemical engineering operations of evaporation, distillation, drying, etc. Koffolt.

Reservoir Engineering—Hydrocarbon Phase Behavior
A. 2 cl., 2 1-2 hr. lab.
Prereq.: 699.
Not open to students with credit in Petr. E. 641 (735).
Quantitative study of the physical nature and phase behavior of subsurface reservoir fluids. Slider.

Reservoir Engineering—Fluid Flow
Sp. 2 cl., 1 2-3 hr. lab.
Prereq.: 641.
Not open to students with credit in Petr. E. 642 (730).
Quantitative study of reservoir fluid flow, including analysis of material balance, producing mechanisms, and well performance. Slider.

Inspection Trip
Repeatable to a maximum of 4 cr. hrs.
These trips will give some practical knowledge of the magnitude of modern chemical engineering operations from a selected variety of industry; the total cost will average about $75. Koffolt. Fee.

Individual Studies in Chemical Engineering
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.

Group Studies in Chemical Engineering
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.

Chemical Process Dynamics and Control I
W. 2 cl., 4 lab. hrs.
Prereq.: 612 or equiv. or permission of instructor; or other than Chem. E. students, permission of instructor.
Study of the dynamics and control of chemical processes; mathematical models of simple processes (excluding control) are derived and simulated using computers. Fresh.

Chemical Process Dynamics and Control II
Sp. 3 cl.
Prereq.: 725 or permission of instructor.
Further development of process dynamics and control topics begun in 725. Fresh.

Chemical Engineering Operations Laboratory
Su. 5 conf., 7-19 lab. hrs.
Prereq.: 612 and 725, or permission of instructor.
The fundamental laboratory course in the chemical engineering operations; laboratory investigation of the operating characteristics and efficiency of chemical engineering equipment as distillation, drying, filtration etc. Haering and Koffolt. Fee.

Petroleum Investigations
A, W, Sp. Library, conf., and lab. work.
Prereq.: 642.
Not open to students with credit in Petr. E. 743 (750).

Engineering Problems of Petroleum and Natural Gas Exploration, Production and Transportation.

Design or Planning of Petroleum Field Development.

The Profession of Chemical Engineering
A. 1 cl.
Prereq.: Chem. E. 5th yr. standing.
The code of ethics of the chemical engineer, professional registration, responsibilities to the societies of the profession, to management, to labor, and as an administrator. Koffolt.

Chemical Engineering Economy
A. 2 cl., 2 comp. lab. hrs.
Prereq.: 609 and 612; or permission of instructor.
Economic consideration in research development, design, and manufacturing in the chemical process industry; cost estimation and economic optimization of chemical engineering operations and chemical processes. Syverson.

Chemical Engineering Processes
A. 2 cl., 2 comp. lab. hrs.
Prereq.: 609 and 612; or 760; or permission of instructor.
Integration of fundamentals of chemistry, chemical engineering operations, thermodynamics, reaction kinetics, and economics for optimum design and operation of chemical process plants. Hershey and Sweeney.

Chemical Engineering Process Development
W. 1 cl., 11 lab. hrs.
Prereq.: 730, 760, and 761; or equiv.
Library, laboratory, and pilot plant research and development of chemical processes of industrial potential, justified by preliminary economic studies; preparation of optimum process flow sheets; plant design studies. Haering, Lynn, and Sweeney. Fee.

Analysis and Organization of Special Project Problem Investigations
W. 6 hrs. conf. and lab.
Prereq.: Chem. E. 5th yr. standing.
Analysis of definite problems having the theoretical and practical application to the chemical industry; individual effort guided by a chemical engineering staff member. Syverson.
764 UG 3
Chemical Engineering Process Design
Sp. 1 cl., 2 4-hr. lab.
Prereq.: 452.
Based on processes developed in 762; equipment design, process control, plant location studies, and economic evaluation of project; work coordinated with Engineering Graphics 755, Haering.

770 UG 3
Applied Electrochemistry
A. 2 cl., 4 lab. hrs.
Prereq.: Chem. 533 or permission of instructor.
The relationship between electrical and chemical energy as applied to chemical industries; discussed and illustrated by laboratory work. Lynn. Fee.

771 UG 3
Air Pollution
Sp. 3 cl.
Prereq.: 3rd professional yr. standing in Engr. or permission of instructor.
Sources of air pollutants, properties of small particles, chemistry of air pollution, dispersion and deposition of air pollutants, and air pollution control. Sweeney.

773 UG 3
Introduction to High Polymer Engineering
A. 3 cl.
Prereq.: 610 and Organic Chem. or permission of instructor.
Engineering of polymerization and polymer forming processes based upon thermodynamics, transport phenomena, and reaction kinetics; relationship of engineering properties of high polymers to molecular characteristics. Lynn.

775 UG 3
Rheology of Fluids
W. 3 cl.
Prereq.: 520; permission of instructor for students not majoring in Chem. E.
Principles of rheology including the characteristics of non-Newtonian materials, measurements, rheological equations of state, viscometric flows, and applications to the flow of industrial materials. Brodkey.

776 UG 3
Principles of Polymer Conversion Operations
Sp. 3 cl.
Prereq.: 773 and 775; or permission of instructor.
Principles of thermodynamics, transport phenomena, polymer chemistry and physics will be related to polymer processing (converting high polymers) through application of mathematical and analytical approaches. Lynn.

778 (766) UG 4
Nuclear Chemical Engineering
W. 3 cl., 3-hr. lab.
Prereq.: Nuclear E. 763 or permission of instructor.
A study of physical, chemical, and economic principles applied to chemical process problems; illustrated by computer computation and radiisotopes-radiation laboratory experiments. Smith.

779 UG 3
Chemical Engineering Experimental Design
A. 3 cl.
Prereq.: Engr. Gr. 200 or equiv., or permission of instructor.
Industrial and research experiments designed with special emphasis on reducing the number of experiments, interpreting final results, and ensuring against unknown factors. Hershey.

781 UG 3
Chemical Engineering Optimization I
Sp. 3 cl.
Prereq.: Engr. Gr. 200 or equiv., or permission of instructor.
Description, analysis, and comparison of the techniques now in use in unimodel optimization; linear programming; geometric programming. Hershey.

785 (791) UG 5 or 6
Special Project Problem Investigations
Su, A, W. Sp. 15 hrs. conf. and lab.
Prereq.: 763 or permission of instructor.
Repeatable to a maximum of 12 cr. hrs. Solution of study problems, either new or continued from 763; extensive theoretical and/or experimental work followed by a comprehensive report. Fee.

786 UG 2
Advanced Petroleum Engineering Technology
Sp. 2 cl.
Prereq.: 543 and 642.
Not open to students with credit in Petr. E. 796 (765).
Library research and seminar discussions of the most recent technical developments in petroleum engineering. Slider.

801 G 1-15
Advanced Special Problems in Chemical Engineering
Su, A, W. Sp. Conf., library and/or lab.
Prereq.: Satisfactory courses in field of problem undertaken.
Repeatable to a maximum of 15 cr. hrs.
A minor problems course covering the chemical engineering operation, instrumentation, thermodynamics, kinetics, the transport fields, and chemical technology. Fee.

808 (820) G 3
Advanced Chemical Engineering Thermodynamics
A. 3 cl.
Prereq.: 609 and 612; or permission of instructor.
Detailed discussion of the thermodynamic properties of pure compounds and mixtures; computational problem work emphasizes the application of thermodynamics in industrial problems. Kay.

809 (821) G 3
Advanced Chemical Engineering Thermodynamics
W. 3 cl.
Prereq.: 808.
Continuation of 808.
812 (830) G 3
Advanced Chemical Engineering Kinetics
Prereq.: 610 and 612; or permission of instructor.
Chemical engineering kinetics from the viewpoint of industrial chemical processes. Haering.

813 (831) G 3
Advanced Chemical Engineering Kinetics
Sp. 3 cl.
Prereq.: 812.
 continuation of 812. Haering.

815 G 3
Advanced Chemical Engineering
Science and Applications
A, W, Sp. 3 cl.
Prereq.: Chem. Engr. grad. standing or permission of instructor.
This series of courses presents advanced concepts of science and engineering as applied to the chemical engineering field under various topics.

815.01 Advanced Mass Transfer—I
815.02 Advanced Mass Transfer—II
815.03 Advanced Distillation and Stage Processes
815.04 Extraction, Azeotropic, and Extractive Distillation
815.05 Advanced Heat Transfer—I
Conduction, radiation and convection.
815.06 Advanced Heat Transfer—II
Condensation, boiling, design applications.
815.07 Drying, Humidification, and Dehumidification
815.08 Advanced Momentum Transfer—I
Basic theory, laminar flow, and phenomenological turbulence.
815.09 Advanced Momentum Transfer—II
Statistical turbulence and mixing.
815.10 Advanced Momentum Transfer—III
Two-phase phenomena.
815.11 Advanced Combustion Principles
815.12 Advanced Instrumentation and Process Control of Chemical Plants
815.13 Design of Experiments
Data handling and analysis, quality control, linear programming.
815.14 Advanced Process and Plant Design
815.15 New or Unusual Chemical Engineering Operations
Examples: adsorption, atomysis, dialysis exclusion, sublimation.

825 G 3
Process Modeling and Simulation
A. 3 cl.
Prereq.: Compu. and Info. Sc. 541 or equiv.
Application of basic chemical engineering principles to construct mathematical models of industrial processes and the simulation thereof by digital and analog techniques. Freeth.

830 (880) G 2-6
Advanced Chemical Engineering
Operations Laboratory
Su, A, W, Sp. 1 conf., 5-17 lab. hrs.
Prereq.: 609, 612, and prereq. or concurr. 730, or permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Chemical engineering fundamentals and operations. Koffolt. Fee.

842 G 3-10
Petroleum Production and Oil Field Development and Operational Problems
A, W, Su.
Prereq.: Permission of instructor.
Not open to students with credit in Petr. E. 842 (802).
Examination and testing of petroleum and petroleum bearing rocks; economic interpretation and application to problems of primary and secondary recovery.

861 G 3
Advanced Chemical Engineering Processes
A. 2 cl., 2 comp. lab. hrs.
Prereq.: 610, 612, 830; prereq. or concurr. 760 or equiv.
Study of selected chemical engineering processes which involve the application of chemistry, thermodynamics, reaction kinetics, heat and mass transfer, oxidation, hydrogenation, polymerization, esterification, and halogenation. Hershey and Sweeney.

862 (870) G 5
Advanced Chemical Engineering Process Development
W. 1 cl., 14 lab. hrs.
Prereq.: 610, 760, and 830.
Original work on development of a new process; basic data for process design and preliminary cost estimate required. Haering, Lynn, and Sweeney. Fee.

873 G 3
Advanced High Polymer Engineering
Sp. 3 cl.
Prereq.: 773 or permission of instructor.
Fundamental studies of polymer properties as related to and controlled by polymer structure; engineering of polymerization process to control polymer structure. Lynn.

881 (905) G 2
Seminar in Chemical Engineering
Prereq.: Grad. standing in Chem. E.
Repeatable to a maximum of 12 cr. hrs.
Formal reports, lectures, and discussions of fundamentals and new developments in science and technology as related to chemical engineering.

999 (950) G Arr.
Research in Chemical Engineering
Research for thesis or dissertation purposes only.
Chemistry

Office: 120 McPherson Chemical Laboratory, 14th West 18th Avenue; General Chemistry Office: 115 McPherson Chemical Laboratory, 140 West 18th Avenue.

Professors Dortman (Chairman), Boweman (Administrative Vice Chairman), Busch, Caley, Calvert, Firestone, Fraenkel, Garrett, Gassman, Harris, Haskins (Emeritus), Hine, Horton, Leussing, Lipincott, Meek, Newman (Regents Professor), Paquette, Rubin, Schechter, Shore, Sweet, Taylor, Van Winkle, Verhoe, Watters, and Wojcicki; Adjunct Professor Shavit; Associate Professors Gel'k, Kurbatov (Emeritus), Levine, MacWood, Ouellette, and Pilzer; Adjunct Associate Professor Kern; Assistant Professors Anderson (Academic Vice Chairman), Berliner, Corfield, Frey, Klaiper, Krusseback, Mathews, Mayer, Schram and Swenton.

101 (407) U 5
Elementary Chemistry
Su, A, W, Sp. 4 cl., 3 lab. hrs.
Prereq.: Eligibility to enroll in Math. 116.
Not open to students with credit for 111 or 121.
A course in the principles of chemistry; the chemistry of the more important elements and compounds including the compounds of carbon. Fee.

102 (408) U 5
Elementary Chemistry
A, W, Sp. 4 cl., 3 lab. hrs.
Prereq.: 101.
Not open to students with credit for 112 or 122.
Continuation of 101; a terminal sequence in chemistry for students requiring only two courses in chemistry. Fee.

111† (404) U 4
General Chemistry
A, W. 3 cl., 3 lab. hrs.
Prereq.: Engr. 1st yr. standing; 1 unit of high school Chem. and eligibility to enroll in Math. 130.
Not open to students with credit for 101 or 121.
A general course in the principles of chemistry intended for students in engineering; metallic elements; applications to quantitative analysis.

112† (405) U 4
General Chemistry
W, Sp. 3 cl., 3 lab. hrs.
Prereq.: 111.
Not open to students with credit for 102 or 122.
Continuation of 111.

113† (406) U 4
General Chemistry
A, Sp. 2 cl., 6 lab. hrs.
Prereq.: 112.
Not open to students with credit for 102, 409, or 123.
Continuation of 112; elementary organic chemistry; non-metallic elements. Fee.

121 (411) U 5
General Chemistry
Su, A, W, Sp. 3 cl., 3 lab. hrs.
Prereq.: One unit of high school Chem., and eligibility to enroll in Math. 150.
Not open to students with credit for 111.
A general course in fundamental chemical principles. Fee.

122 (412) U 5
General Chemistry
Su, A, W, Sp. 3 cl., 3 lab. hrs.
Prereq.: 121; or completion of 101 with a grade of A or B and eligibility to enroll in Math. 150.
Continuation of 121; the chemistry of the most important non-metals and of chemical reactions in solutions. Fee.

123 (413) U 5
General Chemistry
Su, A, W, Sp. 3 cl., 6 lab. hrs.
Prereq.: 122.
Not open to students with credit for 112 or 409.
Continuation of 122; the chemistry of the metals including introductory quantitative analysis. Fee.

H201 (511) U 5
General Chemistry
A. 3 cl., 4 lab. hrs.
Prereq.: Superior performance on placement examination and Math. 151 or equiv.
Not open to students with credit for 101, 111 or 121.
The principles of chemical measurement for selected students. Fee.

H202 (512) U 5
General Chemistry
W. 3 cl., 4 lab. hrs.
Prereq.: 201.
Continuation of 201; the properties of matter and quantitative analysis. Fee.

H203 (513) U 5
General Chemistry
Sp. 3 cl., 4 lab. hrs.
Prereq.: 202.
Continuation of 202; systematic chemistry of the elements. Fee.

204 U 4
Principles of Chemistry
A, W, Sp. 3 cl., 1 3-hr. lab.
Prereq.: Engr. 1st or 2nd yr. curriculum; 1 unit of high school Chem., Math. 152, and Physics 131; prereq. or concurs. Math. 153 and Physics 132.
Fundamental principles of chemistry for engineering students with at least two quarters of college physics and of college mathematics. Fee.

205 U 4
Principles of Chemistry
W, Sp. 3 cl., 1 3-hr. lab.
Prereq.: 204.
Continuation of 204. Fee.
211 (521) U 3  
Quantitative Analysis  
Su, A, W, Sp.  2 cl., 5-6 lab. hrs.  
Prereq.: 113, (409), or 102, or equiv.  
Not open to students with credit for (421).  
A general course in quantitative analysis; gravimetric, volumetric and instrumental analysis.  Fee.

212 (522) U 3  
Quantitative Analysis  
Su, W, Sp.  2 cl., 5-6 lab. hrs.  
Prereq.: 211.  
Not open to students with credit for (422).  
Continuation of 211.  Fee.

221 (531) U 5  
Quantitative Analysis  
A, Sp.  3 cl., 6 lab. hrs.  
H221 (honors) may be available to students enrolled in a college honors program; others with permission of dept.  
Prereq.: 123 or equiv.  
Not open to students with credit for (431).  
The fundamental course in quantitative chemical analysis for students majoring in chemistry.  Fee.

231 (551) U 5  
Organic Chemistry  
A, Sp.  3 cl., 6 lab. hrs.  
Prereq.: 113, (409), 123, or equiv.  
A general introductory course in organic chemistry, including laboratory preparations, arranged for students preparing for dentistry, optometry, veterinary medicine, and medical technology.  Fee.

232 (552) U 5  
Organic Chemistry  
Su, W.  3 cl., 6 lab. hrs.  
Prereq.: 231.  
Not open to students with credit for (452).  
Continuation of 231.  Fee.

241 (647) U 3  
Organic Chemistry  
A, Sp.  3 cl.  
Prereq.: 123 or (409).  
Not open to students with credit for (451) or 231.  
A fundamental course in organic chemistry designed for students preparing for medicine or high school teaching.

242 (648) U 3  
Organic Chemistry  
Su, W.  3 cl.  
Prereq.: 241.  
Not open to students with credit for (452) or 232.  
Continuation of 241.

243 (649) U 3  
Organic Chemistry Laboratory  
A, Sp.  9 lab. hrs.  
Prereq. or concur.: 241.  
Not open to students with credit for (451) or 231.  
A preparation of a series of typical organic compounds, such as are studied in 241-242, their purification, and a study of their properties.  Fee.

244 (650) U 3  
Organic Chemistry Laboratory  
Su, W.  9 lab. hrs.  
Prereq.: 243.  
Not open to students with credit for (452) or 232.  
Continuation of 243.  Fee.

251 (655) U 3  
Organic Chemistry  
A.  3 cl.  
Prereq.: 123 or (409).  
Not open to students with credit for (451), 231, or 241.  
A fundamental course in chemistry designed for chemistry majors and chemical engineers.

252 (657) U 3  
Organic Chemistry  
W.  3 cl.  
Prereq.: 251.  
Not open to students with credit for (452), 232, or 242.  
Continuation of 251.

253 (659) U 3  
Organic Chemistry  
Sp.  3 cl.  
Prereq.: 252.  
Continuation of 252.

254 (656) U 3  
Organic Chemistry Laboratory  
W.  6 or 9 lab. hrs.  
H254 (honors) may be available to students enrolled in a college honors program; others with permission of dept.  
Prereq. or concur.: 251.  
Not open to students with credit for (451-452) or 243-244.  
The preparation, purification, characterization, and study of the properties of typical organic compounds.  Fee.

255 (658) U 3  
Organic Chemistry Laboratory  
Sp.  6 or 9 lab. hrs.  
H255 (honors) may be available to students enrolled in a college honors program; others with permission of dept.  
Prereq.: 254 or concur. 252.  
Not open to students with credit for (451-452).  
Continuation of 254.  Fee.

501 (630) U G 5  
Recent Advances in Chemistry  
Su.  A.  5 cl.  
Prereq.: Academic Year Science Institute students only; 30 cr. hrs. of Chem.  
Not for graduate credit to students majoring in Chem.  
Designed for high school science teachers; recent developments in the theory of valence, particle nature of matter, colloids, high polymers, nuclear chemistry, fuels and photosynthesis.
Radiochemistry
Su. Summer Institute only. 4 cl. each week.
Prereq.: Academic Year Science Institute students only; 1 yr. college Math., 1 yr. college Chem., and 1 yr. college Physics.
Not for credit to students majoring in Chem.
The properties of the nucleus, selection, and preparation of isotopes for tracer work, the application of radioactive isotopes to chemical problems.

Physical Chemistry
Sp. 5 cl.
Prereq.: 242-244 or 252-255, or equiv., Math. 151, and Physics 113.
Not for graduate credit to students majoring in Chem.
A study of the fundamental principles of physical chemistry arranged for students in the biological sciences.

Physical Chemistry
A. 3 cl.
H531 (honors) may be available to students enrolled in a college honors program; others with permission of dept.
Prereq.: 212 or 221 or equiv., Physics 113 or 132, 133 and Math. 254; prereq. or concur. Math. 255.
Not for graduate credit to students majoring in Chem.
The fundamental course in physical chemistry.

Physical Chemistry
W. 3 cl.
H532 (honors) may be available to student enrolled in a college honors program; others with permission of dept.
Prereq.: 531; 552 concur. recommended.
Not for graduate credit to students majoring in Chem.
Continuation of 531.

Physical Chemistry
Sp. 3 cl.
H533 (honors) may be available to students enrolled in a college honors program; others with permission of dept.
Prereq.: 532.
Not for graduate credit to students majoring in Chem.
Continuation of 532.

Physical Chemistry Laboratory
A. Sp. 1 cl., 8 lab. hrs.
Prereq. or concur.: Chem E. 3rd yr. standing, 521 or 533 or equiv. Fee.

Physical Chemistry Laboratory
A. W. Sp. 6 lab. hrs.
Prereq. or concur.: 531.
Quantitative measurements of phenomena of chemical interest and the application of chemical principles to their interpretation. Fee.

Physical Chemistry Laboratory
Sp. 3 cl.
Prereq.: 253 and 533 or equiv.
Selected topics in bonding, molecular orientation, and reactivity of organic compounds and metastable intermediates with emphasis on physical methods of approach.
635* (794) U G 3 Chemistry of the Carbohydrates
A. 3 cl.
Prereq.: 629 or 570 or equiv.
Repeatable to a maximum of 6 cr. hrs., with permission of instructor.
(a) Monosaccharides
(b) Oligosaccharides and polysaccharides
(a) is given in even-numbered years and (b) in odd-numbered years.

651 (761) U G 3 Advanced Inorganic Chemistry I
Su, A. 3 cl.
Prereq.: 533 or permission of instructor.
An introduction to the concepts and chemical systems of inorganic chemistry, including atomic structure, the periodic table, molecular structure and bonding, ionic crystals, defect solid state and electron deficient compounds.

652 (762) U G 3 Advanced Inorganic Chemistry II
W. 3 cl.
Prereq.: 651.
The chemistry of the transition elements; coordination compounds, organometallics, noble gases, representative elements and lower boron hydrides; acid-base theories.

653 (763) U G 3 Advanced Inorganic Chemistry III
Sp. 3 cl.
Prereq.: 652.
A discussion of special topics in modern inorganic chemistry, correlating the group relationships among the non-metallic elements, polyhedral anions and carborane structures.

655 (772) U G 3 Inorganic Chemistry Laboratory
Sp. 9 lab. hrs.
Prereq.: 533 or equiv.
Preparative techniques of inorganic chemistry including the use of liquified gases, aqueous and non-aqueous solutions, anhydrous and oxygen-free systems, fusion reactions, etc. Fee.

661 U G 5 Biochemistry
Sp. 3 75-minute cl.
Prereq.: 251, 252, 253 or equiv. with grade of A or B;
531, 532, 533 or equiv. with grade of A or B.
A survey of biochemistry for the superior advanced undergraduate or the beginning graduate student who does not necessarily plan to do graduate research in biochemistry.

671 (751) U G 3 Nuclear, Radio, and Radiation Chemistry
A. 3 cl.
Prereq.: 533 or equiv.
Nuclear properties, nature of radioactivity, radioactive decay and growth, interactions of radiation with matter, applications.

672 (753) U G 2 Nuclear Chemistry Laboratory
W. 6 lab. hrs.
Prereq.: 671.
Techniques of handling radioactive tracers, the selection and measurement of different types of radiation, neutron activations, and other related laboratory techniques. Fee.

674 (754) U G 4 X rays and Crystal Structure
A. 3 cl., 3 lab. hrs.
Prereq.: Math. 255, Physics 113 or 132, 133, or equiv.
An introduction to the methods of X-ray crystal analysis; theory of symmetry of crystals and of diffraction will be discussed and applied. Fee.

676 (755) U G 3 Colloid Chemistry
W. 3 cl.
Prereq.: 533.
Modern theories of colloidal behavior; adsorption and surface phenomena; physical-chemical methods for the characterization of proteins, high polymers, and inorganic colloids.

693 (761) U G 1-15 Individual Studies in Chemistry
Prereq.: Satisfactory courses in field of the problem and permission of instructor.
Repeatable to a maximum of 60 cr. hrs.
A qualified student may conduct a minor investigation in chemistry.

733 (760) U G 3 Chemistry of Organic Catalysis
W. 3 cl.
Prereq.: 253 or 831 concur.; 533; 651 or equiv.
Not open to students with credit for (866).
Structure of organic catalysts and the mechanism of their reactions.

821 G 3 Advanced Analytical Chemistry
A. 3 1-hr. lec.
Prereq.: 533, 631; or permission of instructor.
Advanced level discussion of electrochemical principles and mass transport processes; discussion of applications to organic and inorganic systems.

822 G 3 Advanced Analytical Chemistry
W. 3 1-hr. lec.
Prereq.: 821 or permission of instructor.
Kinetic and thermodynamic processes of fundamental importance in the characterization of chemical species.

823 G 3 Advanced Analytical Chemistry
Sp. 3 1-hr. lec.
Prereq.: 822 or permission of instructor.
Advanced course in the principles of measurement of the interaction of electromagnetic radiation with matter.
Advanced Organic Chemistry
A. 3 cl.
381-382-383 to be taken in sequence.
An advanced course in the fundamental principles of chemistry covering the aliphatic hydrocarbons and their derivatives.

Advanced Organic Chemistry
W. 3 cl.
Prereq.: 381.
An advanced course in the fundamental principles of chemistry covering aliphatic, hydroaromatic, and aromatic compounds.

Advanced Organic Chemistry
Sp. 3 cl.
Prereq.: 382.
An advanced course in the fundamental principles of chemistry covering a survey of heterocyclic compounds, carbohydrates, proteins, and enzymes.

Advanced Organic Chemistry Laboratory
Su, W. 9 lab. hrs.
Prereq.: Permission of student's graduate adviser.
An advanced course in fundamental reactions and procedures with emphasis on recent advances in techniques.

Advanced Organic Chemistry Laboratory
Su, Sp. 9 lab. hrs.
Prereq.: Permission of student's graduate adviser.
Continuation of 385.

Advanced Inorganic Chemistry
A. 3 cl.
Prereq.: 533, 652, or permission of instructor.
A detailed treatment of the chemistry of the transition elements from the standpoint of molecular and atomic structure, electronic spectra, magnetism, and ligand-field theory.

Advanced Inorganic Chemistry
W. 3 cl.
Prereq.: 651.
A detailed treatment of the chemistry of the transition elements from the standpoint of molecular and atomic structure, electronic spectra, magnetism, and ligand-field theory.

Advanced Inorganic Chemistry Laboratory
Su. 1 cl., 8 lab. hrs.
Prereq.: 551, 552, and (693) or equiv.; 651 or permission of instructor.
Advanced methods for the synthesis, purification, identification, and characterization of inorganic substances.

Research Instrumentation
Sp. 9 lab. hrs.
Prereq.: 533, Physics 132, 133, Math. 255 or equiv.
Background theory and laboratory applications in the use of electrical and electronic instruments in chemical research.

High Polymers
Su, Sp.
Prereq.: 533.
A course in the physical chemistry of macromolecules and their solutions, including the kinetics of polymerization reactions.

X rays and Electron Diffraction
W. 3 cl.
Prereq.: 675.
An advanced consideration of the theory of X rays and electron diffraction and their applications including Fourier methods of parameter determination in elements, etc.

Chemical Kinetics I
A. 3 cl.
Prereq.: 533.
Fundamentals of chemical kinetics in homogeneous liquid and gaseous systems.

Chemical Kinetics II
W. 3 cl.
Prereq.: 875.
Continuation of 875; elementary reactions; chain reactions; fast reaction methods; reaction rates in heterogeneous systems.

Radiation and Photochemical Kinetics
Sp. 3 cl.
Prereq.: 875.
The physical and chemical effects of the absorption of radiant energy, with emphasis on kinetics and mechanism.

Thermodynamics
W. 3 cl.
Prereq.: 875 or equiv.
Introduction to thermodynamics, emphasis on training in the use of thermodynamics as a tool for solving chemical problems.

Statistical Thermodynamics
Sp. 3 cl.
Prereq.: 881.
An introduction to statistical thermodynamics, including quantum statistics, entropy and the third law, statistical-spectroscopic calculation of thermodynamic functions of gases, chemical equilibria, and vapor pressure.
<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>885</td>
<td>1</td>
<td>Colloquium in Chemistry&lt;br&gt;A, W, Sp. 1 cl.&lt;br&gt;Prereq.: Graduate standing in Chem. Required every qtr. of all registered graduate students in Chem. A discussion of current research in chemistry; all divisions.</td>
</tr>
<tr>
<td>941</td>
<td>3</td>
<td>Theoretical Organic Chemistry&lt;br&gt;A. 3 cl.&lt;br&gt;Prereq.: 2nd yr. graduate standing, 831-832. 941-942-943; a sequence of courses in advanced theoretical organic chemistry.</td>
</tr>
<tr>
<td>942</td>
<td>3</td>
<td>Theoretical Organic Chemistry&lt;br&gt;W. 3 cl.&lt;br&gt;Prereq.: 941. Continuation of 941.</td>
</tr>
<tr>
<td>943</td>
<td>3</td>
<td>Theoretical Organic Chemistry&lt;br&gt;S. 3 cl.&lt;br&gt;Prereq.: 942. Continuation of 942.</td>
</tr>
<tr>
<td>970</td>
<td>3</td>
<td>Advanced Thermodynamics&lt;br&gt;A. 3 cl.&lt;br&gt;Prereq.: 881. Continuation of 881 and 882.</td>
</tr>
<tr>
<td>971</td>
<td>3</td>
<td>Quantum Chemistry I&lt;br&gt;A. 3 cl.&lt;br&gt;Prereq.: 533, Physics 113 or 232, 233; preq. or concur. Math. 255 or 555, or equiv.&lt;br&gt;Basic quantum mechanics as a foundation for quantum chemistry: postulates, operators, eigenfunctions, eigenvalues and Schrödinger wave equations; one-dimensional problems including the harmonic oscillator.</td>
</tr>
<tr>
<td>972</td>
<td>3</td>
<td>Quantum Chemistry II&lt;br&gt;W. 3 cl.&lt;br&gt;Prereq.: 971 or equiv.&lt;br&gt;Angular momentum; matrix elements and representations; the hydrogenic atom; perturbation and variation methods; electron spin, and the helium atom; atomic structure and multiplet theory.</td>
</tr>
<tr>
<td>973</td>
<td>3</td>
<td>Quantum Chemistry III&lt;br&gt;S. 3 cl.&lt;br&gt;Prereq.: 972. Electronic structure of molecules: hydrogen molecule and ion, methane, ethylene, benzene, etc.; molecular orbital, valence bond, and self-consistent field methods.</td>
</tr>
<tr>
<td>981</td>
<td>3</td>
<td>Electronic Structure and Spectra of Molecules&lt;br&gt;W. 3 cl.&lt;br&gt;Prereq.: 973 or equiv.&lt;br&gt;An extension of molecular orbital and valence bond theory to larger molecules than those considered in Chemistry 973.</td>
</tr>
<tr>
<td>990</td>
<td>3</td>
<td>Seminar on Topics in Biochemistry&lt;br&gt;Su, A, W, Sp. 3 cl.&lt;br&gt;Prereq.: Permission of instructor. Repeatable to a maximum of 12 cr. hrs. Advanced topics in the biological aspects of chemistry.</td>
</tr>
<tr>
<td>991</td>
<td>3</td>
<td>Seminar in Analytical Chemistry&lt;br&gt;A. 3 cl.&lt;br&gt;Prereq.: Permission of instructor. Repeatable to a maximum of 9 cr. hrs. Topic to be announced.</td>
</tr>
<tr>
<td>992</td>
<td>3</td>
<td>Seminar in Organic Chemistry&lt;br&gt;A, W, Sp. 3 cl.&lt;br&gt;Prereq.: Chem. 2nd yr. grad, standing and 831, 832 or equiv. and permission of instructor. Repeatable to a maximum of 12 cr. hrs. Topic to be announced.</td>
</tr>
<tr>
<td>995</td>
<td>2 or 3</td>
<td>Seminar in Inorganic Chemistry&lt;br&gt;A. 2 cl.&lt;br&gt;Prereq.: 651 and 652 or equiv. and permission of instructor. Repeatable to a maximum of 9 cr. hrs. Topic to be announced.</td>
</tr>
<tr>
<td>996</td>
<td>3</td>
<td>Seminar in Theoretical Chemistry&lt;br&gt;Su, A, W, Sp. 3 cl.&lt;br&gt;Prereq.: 971, 972, and 973; or equiv. Repeatable to a maximum of 9 cr. hrs. Advanced topics in theoretical chemistry including quantum mechanics of molecular wave functions, energies, and rate processes, and quantum and statistical mechanics of condensed phases.</td>
</tr>
<tr>
<td>997</td>
<td>3</td>
<td>Seminar in Physical Chemistry&lt;br&gt;Su, A, W, Sp. 3 cl.&lt;br&gt;Prereq.: At least a 2nd yr. grad. standing in Physical Chem. Repeatable to a maximum of 9 cr. hrs. with permission of instructor. Topic to be announced.</td>
</tr>
</tbody>
</table>
Chinese

Office: 276 Dieter Cunz Hall, 1841 Millikin Road
Professor (Mershon) Li; Associate Professors Ching
(Chairman), Ch’en, and Lao; Assistant Professors
Chang and Lyell.

101 (401) U 5
Elementary Modern Chinese
A, W. 5 cl.
Basic elements of Modern Chinese (Mandarin); the
four tones, sentence structures, and Chinese characters
(of which 620 will be learned in three quarters).
Ching and Staff.

102 (402) U 5
Elementary Modern Chinese
W, Sp. 5 cl.
Prereq.: 101.
Continuation of 101.
Ching and Staff.

103 (403) U 5
Elementary Modern Chinese
A, Sp. 5 cl.
Prereq.: 102.
Continuation of 102.
Ching and Staff.

104 (404) U 5
Intermediate Modern Chinese
A. 5 cl.
Prereq.: 103 or permission of instructor.
Four hundred additional characters, further
combination of characters in three quarters; complex
sentence structure; readings adapted from modern
Chinese literature. Ching and Staff.

105 (505) U 5
Intermediate Modern Chinese
W. 5 cl.
Prereq.: 104 or permission of instructor.
Not open to students with credit for 405.
Continuation of 104.
Ching and Staff.

106 (506) U 5
Intermediate Modern Chinese
Sp. 5 cl.
Prereq.: 105 or permission of instructor.
Not open to students with credit for 406.
Continuation of 105. Ching and Staff.

231 (571) U 5
Elements of Chinese Culture
Su, A. 5 cl.
Taught in English.
Not open to students with credit for 271.
Survey of the major philosophical trends of
Confucianism and Taoism in China; discussion of
Chinese mythology, religion, art, and literature.
Lyell.

251 (551) U 3
Chinese Literature in Translation: Early Period
Su, W. 3 cl.
Historical, philosophical, and poetical classics of
China. Lyell.

252 U 3
Chinese Literature in Translation:
Middle and Modern Periods
Su, Sp. 3 cl.
Masterpieces of late classical poetry and the
vernacular novel; representative works of modern
fiction, poetry, and drama. Lyell.

501 U 5
Classical Chinese I
A. 5 cl.
Prereq.: 106 or permission of instructor.
Not open to students with credit for 601 or 651.
Selected readings from representative authors of
classical times. Lyell.

502 U 5
Classical Chinese II
W. 5 cl.
Prereq.: 501 or permission of instructor.
Not open to students with credit for 602 or 652.
Continuation of 501. Lyell.

503 U 5
Classical Chinese III
Sp. 5 cl.
Prereq.: 502 or permission of instructor.
Not open to students with credit for 603 or 653.
Continuation of 502. Lyell.

507 U G 3
Advanced Modern Chinese I
A. 3 cl.
Prereq.: 106 or permission of instructor.
Not open to students with credit for 609.
Reading of contemporary prose and verse, presentation
of oral and written reports, drill in tone and intonation,
practice in translation. Ch’en and Staff.

508 U G 3
Advanced Modern Chinese II
W. 3 cl.
Prereq.: 507 or permission of instructor.
Not open to students with credit for 610.
Continuation of 507. Ch’en and Staff.

509 U G 3
Advanced Modern Chinese III
Sp. 3 cl.
Prereq.: 508 or permission of instructor.
Not open to students with credit for 611.
Continuation of 508. Ch’en and Staff.
641 U G 3
History of Chinese Thought
Sp. 3 cl.
Prereq.: 231 or permission of instructor.
Detailed examination of the major Chinese philosophies; readings from selected Chinese texts.
Chang.

654 U G 3
History of Chinese Literature: Early Period
A. 2 cl.
Prereq.: 503 and 509, or permission of instructor.
Chinese literature from the earliest times to the Late T'ang (9th century). Li.

655 U G 3
History of Chinese Literature: Middle Period
W. 2 cl.
Prereq.: 503 and 509, or permission of instructor.
Chinese literature from the Northern Sung (11th century) to the end of the Ch'ing (early 20th century); perpetuation of classical forms; rise of vernacular writings. Li.

656 U G 3
History of Chinese Literature: Modern Period
Sp. 2 cl.
Prereq.: 503 and 509, or permission of instructor.
Modern Chinese literature (May Fourth Movement to the Hundred Flowers Blooming); its contacts with world literature; changes in literary and language styles. Ch'en.

680* U G 3
Introduction to Chinese Linguistics
A. 3 cl.
Prereq.: 103 and Ling. 601, or permission of instructor.
A general investigation of the history, phonology, morphology, syntax, and lexicon of the Chinese language.

681†* U G 3
History of the Chinese Language
A. 3 cl.
Prereq.: 103 and Ling. 601, or permission of instructor.
An investigation of the relations between modern Chinese and its earlier stages, ancient and archaic Chinese.

683 U G 3
Study of the Chinese Writing System
Sp. 3 cl.
Prereq.: 103 or permission of instructor.
A critical study of the origin, classification, composition, and development of the Chinese writing system, including problems in simplification and alphabetization. Ching.

693 (695) U G 1-5
Individual Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Directed study to meet individual research needs of students in area studies and East Asian programs; not a substitute for regular language courses.

694 U G 1-5
Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Investigation of minor problems in Chinese language and literature; not a substitute for regular language courses.

751 U G 3
Selected Readings in Scholarly Chinese Texts I
A. 3 cl.
Prereq.: 509 or permission of instructor.
Academic writings in the humanities and social sciences by modern Chinese scholars in both the wen-yen and p'ai-hua styles. Lao.

752 U G 3
Selected Readings in Scholarly Chinese Texts II
W. 3 cl.
Prereq.: 751 or permission of instructor.
Continuation of 751. Lao.

753 U G 3
Selected Readings in Scholarly Chinese Texts III
Sp. 3 cl.
Prereq.: 752 or permission of instructor.
Continuation of 752. Lao.

761†* U G 3
Modern Chinese Poetry
A. 3 cl.
Prereq.: 656 or permission of instructor.
Lectures and readings covering major poets since 1919. Ch'en.

762†* U G 3
Modern Chinese Prose
W. 3 cl.
Prereq.: 656 or permission of instructor.
Studies of various types of prose literature of the May Fourth Movement and the Communist period. Lao.
763+ U G 3
Modern Chinese Fiction
Sp. 3 cl.
Prereq.: 654 or permission of instructor.
Not open to students with credit for 706.
Works by major authors before and after 1949.
Li.

771+ U G 3
Traditional Chinese Poetry
A. 3 cl.
Prereq.: 654 and 655, or permission of instructor.
Not open to students with credit for 703.
Lectures and readings from ancient odes and songs
and the later shih and ta'ku poetry. Ch'en.

773†+ U G 3
Traditional Chinese Fiction
Sp. 3 cl.
Prereq.: 654 and 655, or permission of instructor.
Not open to students with credit for 701.
Lectures and readings in classical and vernacular
fiction. Li.

774†+ U G 3
Traditional Chinese Drama
Sp. 3 cl.
Prereq.: 654 and 655, or permission of instructor.
Not open to students with credit for 702.
A lecture and reading course in Yuan, Ming, and
Ch'ing drama. Ch'en.

782 U G 3
Chinese Phonology
W. 3 cl.
Prereq.: 680 or 681 or permission of instructor.
Not open to students with credit for 624.
A detailed analysis of the phonological structure of
Mandarin Chinese. Ch'ing.

7H763† U 3-5
Honors Course
Prereq.: 4th yr. standing; a record of A in at least half
of the Chinese courses taken and an average of B in
the remainder; permission of instructor under whose
supervision the work is to be completed and the
College Committee on Honors.
Failure to receive a grade of at least B in this course
is a disqualification for special honors.
Open only to candidates for B.A. in Chinese.
A program of reading arranged for each student, with
individual conferences, reports and honor thesis.

784 U G 3
Chinese Syntax
W. 3 cl.
Prereq.: 680 or 681 or permission of instructor.
Not open to students with credit for 626.
An investigation of the syntactic structure of
Mandarin Chinese.

800 G 3
Chinese Bibliography and Research Methods
A. 3 cl.
Prereq.: 654 and 655 or permission of instructor.
Not open to students with credit for 703.
An introduction to bibliographies and reference
works; general and specific problems for research.
Lao.

879 G 3-5
Seminar in Traditional Chinese Literature
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.
An intensive reading course in traditional Chinese
literature with a selected topic for each offering
and research projects for individual students; topic
to be announced.

999 G Arr.
Research in Chinese
Research for thesis or dissertation purposes only.

Circulation Technology
(School of Allied Medical Professions)
Office: 350 B Starling Loving Hall, 320 West 10th
Avenue
Associate Professor Vasko (Division Director):
Instructor Dearing (Associate Director).

400 U 5
The Aseptic Environment
W. 3 cl., 2 2-hr. lab., 2 4-hr. clinical experience.
Prereq.: Permission of instructor.
An introduction to the aseptic environment with
emphasis on the student's function within this
environment as a member of the medical-surgical team.
Dearing and Staff.

410 U 8
Applied Circulation Technology
Sp. 5 cl., 2 4-hr. lab., 2 2-hr. conf.
Prereq.: Permission of instructor.
The application of anatomic and physiological
principles in the use of various perfusion devices.
Dearing and Staff.

420 U 5
Circulation Technology Instrumentation
Sp. 3 cl., 2 2-hr. lab.
Prereq.: Permission of instructor.
The application of mechanical and electronic principles
to the instrumentation unique to circulation technology
with emphasis on design and selection of equipment.
Toth.
City and Regional Planning

Office: 107 Brown Hall, 190 West 17th Avenue
Professor Gerckens; Associate Professor Mills; Assistant Professors Anderson and Elmer; Adjunct Professor Crozier; Instructors.

300 U 3 Outlines of City Planning
Sp. 3 cl.
Prereq.: 3rd yr. standing or permission of instructor.
Not open to students with credit for Arch. (709).
Analysis of city planning practices and principles; examination of representative problems in contemporary urban development and proposed solutions. Gerckens.

731 (791) U G 3 Outlines of Urban Design
A. 2 cl., 3 lab. hrs.
Prereq.: Grad. standing in City Plan., or senior standing in Arch., or permission of instructor.
Elements and criteria of urban design; comparative evaluation of urban design work. Elmer.

742 U G 3 History of City Planning to 1900
W. 3 cl.
Prereq.: 3rd yr. standing or permission of instructor.
History of city planning from the earliest discovered settlements to the beginning of contemporary planning. Gerckens.

794 (799) U G 1-5 Group Studies in City and Regional Planning
Prereq.: Permission of instructor.
794.01 City and Regional Planning History
794.02 Planning Theory
794.03 Regional Planning
794.04 Urban Design
794.05 Planning Analysis
794.06 Housing
794.07 Circulation
794.08 Open Space and Recreation
794.09 Community Facilities
794.10 Land-Use
794.11 Urban Renewal
794.12 Unclassified

811 (721) G 3 Recent History of City and Regional Planning
Sp. 3 cl.
Prereq.: Grad. standing in City Plan.
Development of City and Regional Planning since 1980; evolution of planning concepts and methods in response to urbanization and resource development; emphasis on American work. Gerckens.

812 (722) G 3 Theory of City and Regional Planning
A. 3 cl.
Prereq.: Grad. standing in City Plan.
Planning processes; the general plan; formulating goals; land development policies and decisions; alternative urban and regional forms; role and scope of planning. Gerckens.
Outlines of Regional Planning
Sp. 3 cl.
Prereq.: Grad. standing in City Plan. or in a Conserv. program.
State, national, and regional planning; components of regional development; regional analysis and design. Anderson.

City and Regional Planning Analysis
W. 3 cl., 6 lab. hrs.
Concur.: 842.
Techniques of research and analysis in planning; land use, employment, population, housing market, and transportation studies. Mills.

City and Regional Planning Analysis
Sp. 2 cl., 3 lab. hrs.
Prereq.: 832; concur. 843.
Continuation of 832; use of forecasts, analytic models; cost-benefit analysis and other tests of planning and transportation studies. Mills.

Introduction to Planning Design
A. 2 cl., 3 lab. hrs.
Prereq.: Grad. standing in City Plan.
Principles and practices of environmental design applied to problems of urban scale; graphic presentation of planning information. Anderson and Mills.

Elements of City Planning Practice
W. 1 cl., 6 lab. hrs.
Prereq.: 841; concur. 842.
Physical components of urban areas; residential, commercial, industrial, pedestrian, and vehicular circulation, other community facilities; analysis of design criteria and standards. Eimer.

Elements of City Planning Practice
Sp. 3 cl., 6 lab. hrs.
Prereq.: 832 and 842; concur. 833.
Continuation of 842. Eimer.

Planning Design
A. 15 lab. hrs.
Prereq.: 833 and 843.
Preparation of general urban plans. Anderson.

Planning Design
W. 15 lab. hrs.
Prereq.: 851.
Continuation of 851. Anderson.

Planning Design
Sp. 15 lab. hrs.
Prereq.: 852.
Continuation of 852. Anderson.

Land-Use Controls
Sp. 3 cl.
Prereq.: Grad. standing in City Plan.
Legal basis of land-use controls in the United States, provisions, procedures and issues in zoning, subdivision regulation, urban renewal, building and housing codes, and acquisition of real property for public use. Simmons.

City and Regional Planning Administration
W. 3 cl.
Prereq.: Grad. standing in City Plan.
Administration of official planning agencies; professional practice; capital improvement programming. Anderson.

Interdepartmental Seminar
(See under Interdepartmental Seminars.)

Research in City and Regional Planning
Research for thesis purposes only.

Civil Engineering
Office, 226 Civil and Aeronautical Engineering Building, 2036 Neil Avenue.
Professors Gray (Chairman), Karrer, Large (Emeritus), Majidzadeh, Moulton, Ojala, Smith, Treimer, Vandegrift (Emeritus), Washington, and Wu; Associate Professors Bishara, Bietzacker, Chen, Coffman, Cosens, Hong, Mintzer, Monz (Emeritus), Purtz, Ricca, Rubin, Sandhu, and Shumate; Assistant Professors Birkhoff, Hooper, and Nemeth; Instructors.

Elements of Surveying
A, W. 3 cl., 2 3-hr. lab.
Prereq.: Physics 131 or 231.
Theory and practice of measurements; orientation by celestial observations; fundamentals of photogrammetry. Purtz.

Photogrammetry
W. 3 cl., 1 3-hr. lab.
Prereq.: 202 or 401.
Fundamental geometry and photogrammetric applications to engineering. Mintzer.

Surveying II
Sp. 3 cl., 2 3-hr. lab.
Prereq.: 202 or 401, and Engr. Gr. 200.
Topographic mapping, curves, and earthwork. Purtz.
404  (650)  U 3
City Surveying
Sp. 2 cl., 1 3-hr. lab.
Prereq.: 403.
City control surveys, coordinates of lot and block corners; measurement of details, computation of areas; setting out city plans.

405  U 5
Observational Analysis
W. 4 cl., 1 3-hr. lab.
Prereq.: 202 and Math, 254.
Theory and application of observational analysis. Purtz.

410  (620)  U 3
Environmental Pollution Control
W. 3 cl.
Prereq.: Chem. 113 or equiv.; concurr. Microbiol. 607 or equiv.
Not open to students majoring in Civil E.
A study of the human environment from a health engineering point of view, with emphasis on those facets of the health picture that are controllable by engineering developments. Cosens and Shumate.

430  (604)  U 4
Structural Analysis I
W. 4 cl.
Stresses in statically determinate frames and trusses; influence lines, moving loads, and space frames. Chen, Ojaivo, and Smith.

451†  U 4
Civil Engineering Materials I
A. 3 cl., 1 3-hr. lab.
Composition and structure of civil engineering materials; elastic, plastic and viscous behavior under various environmental and loading conditions. Majidzadeh.

470†  U 4
Transportation I
W. 3 cl., 1 3-hr. lab.
Elements of transportation systems; geometric design of transportation facilities, including highways, railroads, waterways, and airways; route location and criteria, including aerial photogrammetry. Hone.

510  (616)  U G 3
Principles of Hydraulics
W. 3 cl.
Prereq.: Math. 151 and Physics 111 or 131.
Not open to students majoring in Civil E.
Fluid properties; hydrostatics; flow concepts and definitions; study and use of the continuity, energy, and momentum equations for problem solving; methods of flow measurement, pipe and channel flow, and topics in groundwater flow. Ricca.

511  (611)  U 3
Fluid Mechanics
Sp. 3 cl.
Fluid properties; fluid statics; viscous and turbulent fluid flow; dimensional analysis and similarity Ricca.

512  (728)  U G 3
Applied Hydraulics
A. 3 cl.
Prereq.: 511.
Civil engineering applications of fundamental fluid mechanics principles including pipe and open channel flow, masonry and earth dams, and pumps, with laboratory studies to support the above topics. Ricca.

530  (711)  U G 3
Elementary Structural Engineering
W. 3 cl.
Not open to students majoring in Civil E.
Design of simple steel structures; introduction to reinforced concrete. Purtz.

531  (741)  U G 4
Structural Analysis II
Sp. 4 cl.
Prereq.: 430 or 530, and Engr. Mech. 420.
Deflection in trusses, beams and frames; solution of indeterminate structures by methods of consistent deformations, and moment distribution. Chen, Ojaivo, and Smith.

551  (622)  U 4
Soil Mechanics I
Sp. 3 cl., 1 3-hr. lab.
Prereq. or concurr.: Engr. Mech 420.
Basic and engineering soil properties; fluid flow through soils; compaction, effective stresses and compression. Coffman, Hooper, and Wu.

552  (623)  U 4
Civil Engineering Materials II
A. 3 cl., 1 3-hr. lab.
Prereq.: 551.
Composition, properties, and production of portland cement concrete, bituminous materials, and bituminous mixtures. Majidzadeh.

553†  U G 3
Soil and Structural Mechanics
Sp. 3 cl.
Properties of soils and structural materials and their application to analysis of stresses and displacements in soil masses and structural members. Wu.

570†  (710)  U G 5
Transportation Planning
A. 4 cl., 2-hr. seminar.
Prereq.: Permission of instructor.
Not open for credit to students in Civil E.
An analysis of engineering factors affecting location, geometric design, operation, maintenance, and management of coordinated transportation systems. Karrer.
571 (624) U 4  
Transportation I  
A. 3 cl., 1 2-hr. lab.  
Prereq.: 405.  
A study of the development, location, geometric design, economics, finances, and operation of transportation systems. Hong, Karrer, and Treiterer.

572† U 4  
Transportation II  
Sp. 3 cl., 1 3-hr. lab.  
Prereq.: 405, 451, and 470.  
Design, construction, and maintenance of roadway, railway, and runway structures including earthwork and drainage, and flexible and rigid pavements. Hong.

574† U 3  
Transportation III  
W. 3 cl.  
Prereq.: 572.  
Operations and control of transportation systems, and evaluation of their performance in efficiency and safety; economics of alternative transportation systems. Hong.

581 (661) U 4  
Principles of Rock Mechanics  
Sp. 4 cl.  
Prereq.: 552 and Geol. 100.  
Fundamental rock properties and the evaluation and design of competent underground openings; drilling and blasting theories; explosives and their application. Verner.

582 (662) U 3  
Mining Systems Engineering  
A. 3 cl.  
Prereq.: 552 and Geol. 100.  
Fundamentals of mining systems for bedded, massive, vein, and surface deposits. Verner.

602 U 4  
Applications of Photo Interpretation in Land Use Planning  
A. 3 cl., 1 3-hr. lab., 2 half-day field trips.  
Not open for credit to students majoring in Civil E.  
The nature, scope, principles, and methodology of, and techniques of photo interpretation and their applications in the analysis of land use. Mintzer.

611 (703) U 5  
Principles of Sanitary Engineering I  
W. 5 cl.  
Prereq.: 512.  
Not open for grad. credit to students majoring in Civil E.  
Basic principles of water resources including hydrology; reservoirs; design of transmission, distribution, and collection systems; supply and demand rates; statistical methods; construction materials and methods. Cosens and Washington.

612 (716) U 5  
Principles of Sanitary Engineering II  
Sp. 5 cl.  
Prereq.: 512 and 611.  
Not open for grad. credit to students majoring in Civil E.  
Unit operation in water supply and waste water recovery including selection, treatment methods and equipment, and water quality criteria. Cosens and Washington.

613 (742) U 4  
Applied Hydrology  
A. 4 cl.  
Prereq.: 512 or equiv.  
Hydrologic cycle, meteorology, streamflow, evapotranspiration, hydrographs, runoff relations, runoff hydrographs, groundwater, unit hydrographs, flood routing, frequency and duration studies, and application of hydrologic techniques. Rice.

631 (714) U 5  
Structural Design I  
A. 3 cl. 2 2-hr. lab.  
Prereq.: 531.  
Elastic design of simple steel structures; introduction to plastic design of continuous beams and simple bents. Smith.

632 (701) U 5  
Reinforced Concrete Design I  
Sp. 5 cl.  
Prereq.: 531 and 552.  
Not open for grad. credit to students majoring in Civil E.  

651 (725) U 4  
Soil Mechanics II  
W. 2 cl., 1 3-hr. lab.  
Prereq.: 551.  
Not open for grad. credit to students majoring in Civil E.  
Stress distribution, shear phenomena, lateral earth pressure, settlement, and soil stability. Colfman, Hooper, and Wu.

652 (750) U 4  
Mechanical Properties of Engineering Materials  
W. 4 cl.  
Prereq.: 552, Engr. Mech. 521, Met. E. 400, or permission of instructor.  
Structure of liquids and solids, elasticity, plasticity and flow, viscosity, viscoelasticity and fracture phenomena. Majidzadeh.

671 (724) U 3  
Transportation II  
W. 3 cl.  
Prereq.: 552 and 571.  
Design, construction, and maintenance of embankments, drainage structures, and pavements for highways and airports. Hong, Karrer, and Treiterer.
672 U G 3
Fundamentals in Traffic Engineering
Sp. 2 cl., 1 3-hr. lab.
Prereq.: 571.
An introduction to traffic characteristics, measurements, controls, and regulations; elements in traffic operation, design, and planning. Treiterer.

673 U G 3
Highway Location and Design
W. 2 cl., 1 3-hr. lab.
Prereq.: 571.
Geometric design of roads and streets; determination of alignment, grade, intersections, and traffic capacity of rural roads. Karrer and Treiterer.

674 U G 4
Airport Design and Operation
Sp. 3 cl., 1 3-hr. lab.
Prereq.: 671.
Airport configuration, design, and capacity; development of the terminal area; operational aspect of air traffic and the terminal area; design and operation of heliports. Treiterer.

680† U 3
Mine Valuation and Mineral Economics
W. 3 cl.
Prereq.: 582, and Econ. 201 or equiv.
Theories of mineral sampling, calculation of ore reserves, present and future worth of mineral properties, and mineral property examination; economic case studies of major minerals. Verner.

701 U G 4
Civil Engineering Applications of Photo-Interpretation
Sp. 2 cl., 2 2-hr. lab.
Prereq.: 400, 671, and 1 course in Geol.
Principles of photo-interpretation, geology, and geomorphology applied to construction, transportation, and hydraulic problems; studies of air-photo indices of soils and aggregate sources; and construction problems. Mintzer. Fee.

711 U G 3
Sanitary Engineering Laboratory
A. 2 3-hr. cl. and lab.
Prereq.: 612, Chem. 113 or equiv., and Microbiol. 607 or equiv.
A laboratory study of the sanitary engineering indices pertinent to the control of water, sewage, streams, and industrial waste quality. Rubin.

712 U G 3
Sanitary Engineering Design
Sp. 3 cl.
Prereq.: 612.
The design of unit operations and processes employed in the field of water supply and waste water, including data collection and control instrumentation. Cosens and Washington.

713 U G 3
Environmental Engineering Measurements
W. 2 cl., 2 2-hr. lab.
Prereq.: 711, Chem. 221 or permission of instructor.
The application of advanced physical and chemical measurements to environmental engineering problems; instrumentation involving spectrophotometric, chromatographic, nephelometer, and radiation measurement techniques. Rubin.

716 U G 3
Water Resources Engineering Projects
A. 3 cl.
Prereq.: 612.
An integrated study of design principles and methods used on engineering projects involving dams, reservoirs, and related facilities. Cosens.

731 U G 4
Reinforced Concrete Design II
A. 4 cl.
Prereq.: 632.
Not open for grad. credit to students majoring in Civil E.
Analysis and design of reinforced concrete systems. Bishara and Chen.

732 U G 3
Timber Design
W. 3 cl.
Basic properties of and design practice for timber when used as a construction material in engineering structures. Smith.

734 U G 3
Design of Arch Structures
Sp. 3 cl.
Prereq.: 531, 631, and 632.
The analysis and design of arch structures. Ojavo and Smith.

738 U G 4
Bridge Engineering Projects
W. 4 cl.
Prereq.: 731.
Integrated student projects involving applications of principles and methods used in the design and construction of bridge structures. Smith.

737 U G 3
Prestressed and Precast Concrete Structures
A. 3 cl.
Prereq.: 632.
Structural analysis and proportioning of prestressed concrete members and of precast structural concrete systems. Bishara.

751 U G 4
Principles of Foundation Analysis and Design
A. 4 cl.
Prereq.: 631.
Subsurface exploration; shallow foundations; piles and caissons; embankments and excavations. Hooper and Wu.
752 (731) U G 4
Soil Stabilization
W. 2 cl., 2 3-hr. lab.
Prereq.: 255.
Study of principles of soil stabilization for highway surfaces; design, durability, mechanical properties, and construction. Coffman and Majidzadeh.

771 (723) U G 3
Construction Methods and Equipment
A. 2 cl., 1 3-hr. lab.
Prereq.: 671.
Selection and management of construction equipment in building of highways, dams, airports, bridges, and structures. Karrer.

772 (739) U G 4
Bituminous Materials and Mixtures
Sp. 3 cl., 1 3-hr. lab.
Prereq.: 671.
Types and chemical composition of asphaltic materials, physical and chemical properties of asphaltic materials and mixtures. Majidzadeh.

773 U G 4
Management of Engineering Construction
W. Sp. 3 cl., 1 2-hr. lab.
Prereq.: 771 or permission of instructor.
Planning, scheduling, and supervision of engineering construction projects; use of Critical Path Method, bar charts, and other techniques. Karrer.

776 (745) U 4
Highway Engineering Projects
Sp. 3 cl., 1 3-hr. lab.
Prereq.: 512, 651, and 671.
Integrated student projects involving the application of principles and methods used in the design and construction of multi-lane highways. Hong and Treiterer.

794 (799) U G 3-5
Group Studies in Civil Engineering
Prereq.: Senior or grad. standing with point-hour ratio of 2.5 or better, and permission of dept. chairman.
Repeatable to a maximum of 20 cr. hrs., not more than 10 of which shall be in any one of the following fields.
The advanced student is given opportunity to pursue advanced study; work undertaken may be elected in the following fields of civil engineering:
  a. Structural Engineering.
  c. Sanitary Engineering.
  d. Highway and Transportation Engineering.
  e. Geodetic and Photogrammetric Engineering.
  f. Construction.
  g. Materials.
  h. Hydraulics and Hydrology.

801f (808) G 3-5
Geodesy
A. Sp.
Prereq.: 601 and Math. 255, Civil E. Master's candidates.
Triangulation reconnaissance, use and computation of geographic coordinates, study of various systems of plane coordinates, the more common map projections, geodetic astronomy and other problems involving the figure of the earth.

810 (831) G 5
Principles of Advanced Sanitary Engineering
A. 3 cl., 2 3-hr. lab.
Prereq.: 612, prereq. or concur. 711.
Advanced analysis and design theory pertinent to the field of sanitary engineering, including water supply, waste water disposal, steam and environmental sanitation, and atmospheric pollution. Shumate.

811 (832) G 5
Principles of Advanced Sanitary Engineering
W. 3 cl., 2 3-hr. lab.
Prereq.: 810.
Continuation of 810. Shumate.

812 (833) G 5
Principles of Advanced Sanitary Engineering
Sp. 3 cl., 2 3-hr. lab.
Prereq.: 811.
Continuation of 811. Washington.

830 (826) G 5
Advanced Structural Engineering I
A. 4 cl., 1 3-hr. lab.
Prereq.: 531 or equiv.
Analysis and design of statically indeterminate beams, frames, and trusses, using classical methods of analysis. Smith.

831 (827) G 5
Advanced Reinforced Concrete
W. 5 cl.
Prereq.: 731 and 737.
Concrete structural analysis and design; special structural systems and elements. Bishara.

832 (828) G 5
Plastic Analysis and Design
A. 5 cl.
Prereq.: 531 and 631 or equiv.
Structural behavior in the inelastic range; prediction of collapse loads; structural steel design according to the plastic method. Ojavo.

833 (829) G 5
Concrete Shell Structures
Sp. 5 cl.
Prereq.: 631, 731, and Math. 412.
Analysis and design of folded plate, barrel, and other prismatic structures; domes, hyperbolic and elliptical paraboloids. Ojavo.

834 (835) G 5
Structural Analysis and Design for Dynamic Disturbances
Sp. 5 cl.
Prereq.: 631, 731, and Engr. Mech. 410; or equiv.; or permission of instructor.
Structural dynamics; principles and practice of dynamic design; numerical and graphical methods. Chen.
835 G 5 Matrix Structural Analysis  
W. 5 cl.  
Prereq.: 531 or equiv.; or permission of instructor.  
Analysis of skeletal structures by force and displacement methods using matrices; introduction to finite element method. Chen.

850 (810) G 5 Seepage in Permeable Materials  
A. 5 cl.  
Prereq.: 551.  
Analysis of seepage volume and stresses in connection with excavation, dams, wells, slopes, and subsurface drainage; electro-osmosis. Gray and Wu.

851 (815) G 5 Advanced Soil Properties  
W. 3 cl., 6 lab. hrs.  
Prereq.: 651.  
Detailed study and analysis of the mechanical properties of soils, with applications to foundation behavior. Gray and Wu.

852 (805) G 5 Structural Design of Pavements  
Su. 5 cl.  
Prereq.: 851.  
Stresses in pavements and behavior under moving loads, design of flexible and rigid pavements for highways and airports.

853† (816) G 5 Soil-Structure Interaction I  
Sp. 5 cl.  
Prereq.: 851.  
Beams and struts in elastic foundation; pavement slabs; analysis and design of pile groups resisting lateral loads; stress distribution in soils. Gray.

854* (817) G 3 Theoretical Soil Mechanics  
W. 3 cl.  
Prereq.: 850 and 851.  
Use of mathematical and numerical methods in solution of soil mechanics problems; stress and displacements in soil masses and slopes, earthquake stresses, consolidation and frost penetration. Gray, Sanchu, and Wu.

855* (818) G 5 Soil-Structure Interaction II  
Sp. 5 cl.  
Prereq.: 851.  
Plastic equilibrium of soil masses; bearing capacity theories; slope stability analysis; earth pressure theories; comparison between theoretical and experimental results. Coffman and Wu.

856 G 5 Viscoelasticity I  
Sp. 5 cl.  
Prereq.: 652 and Math. 513.  
Viscoelastic materials and their characteristics, discrete element models, spectral representation, creep and relaxation functions, and dynamics of viscoelastic behavior. Majidzadeh.

857 G 5 Theory of Viscoelasticity  
A. 5 cl.  
Prereq.: 856 and Math. 514.  

858† G 3 Soil Dynamics  
A. 3 cl.  
Prereq.: 851 and Engr. Mech. 731, or permission of instructor.  
Stress waves in soils and vibration in soil masses; soil behavior under impact and repeated loading; design problems including vibrating foundations, blast pressures, and seismic stability. Wu.

870 (825) G 5 Highway Administration  
Sp. 5 cl.  
Prereq.: 672.  
A study of organization for planning, constructing, maintaining, and operating systems of roads and streets. Hong and Karrer.

871 (821) G 5 Traffic Engineering I  
A. 4 cl., 1 3-hr. lab.  
Prereq.: 671 and Engr. Gr. 200, or equiv.; prereq. or concurr. Math. 520.  
Traffic characteristics and studies: theory of traffic flow, dynamics of traffic movement, intersection performance, capacity, parking, accidents, origin-destination. Treiterer.

872 (820) G 5 Traffic Engineering II  
W. 4 cl., 1 3-hr. lab.  
Prereq.: 871 or equiv.  
Principles of traffic operations in rural and urban areas: traffic laws, regulations, control and administration, street lighting, bus operation, parking, and terminal operations. Treiterer.

873 G 5 Traffic Engineering III  
Sp. 4 cl., 1 3-hr. lab.  
Prereq.: 872 or equiv.  
Urban transportation: principles of trip generation, forecasting distribution and assignment, network analysis, mass transportation planning, terminal location, evaluating alternative urban transportation systems, and trends in urban technology. Treiterer.
885 (899) G 3-5
Advanced Civil Engineering
Prereq.: Permission of dept. chairman.
Repeatable to a maximum of 20 cr. hrs., not more than 10 of which shall be in any one of the fields listed below.
This course is intended to give the advanced students opportunity to pursue advanced study; work undertaken may be elected in the following fields of civil engineering.
  a. Structural Engineering.
  c. Sanitary Engineering.
  d. Highway and Transportation Engineering.
  e. Geodetic and Photogrammetric Engineering.
  f. Construction.
  g. Materials.

896 G 1-3
Interdepartmental Seminar in Polar and Alpine Studies
Sp.
(See under Interdepartmental Seminars.)

999 (950) G Arr.
Research in Civil Engineering
Research for thesis or dissertation purposes only.

Classics
Office: 217 Derby Hall, 134 North Oval Drive
Professors Morford (Chairman), Abbott, Babcock, Forbes, and Titchener (Emeritus); Associate Professors Cleary and Lenardon; Assistant Professors Davis, Hahn, Schlam, Shumaker, and Snyder; Adjunct Assistant Professor Drachman.
See also Greek and Latin.

120 U 3
Aspects of Greek Civilization
A.
Not open to students with credit for 124, 125, 220, 221, 222, 224, or 225.
Introductory studies concentrating on one area such as: The Bronze Age; Fifth Century Greece; The Age of Alexander.

121 U 3
Aspects of Roman Civilization
W.
Not open to students with credit for 124, 125, 220, 221, 222, 224, or 225.
Introductory studies concentrating on one area such as: The Republic; The Augustan Age; The Empire.

122 U 3
Aspects of Classical Religion and Mythology
Sp.
Not open to students with credit for 124, 125, 220, 221, 222, 224, or 225.
Introductory studies concentrating on one area such as: Sage; the Gods—Myth and Ritual; Roman Religion and Mythology.

H124 U 5
The Greeks
A. 2 2-hr. cl.
Prereq.: Open only to Freshman Honors Scholars and freshmen enrolled in the Honors Program of a college; permission of Dept.
Discussion of the Greek achievement in literature, history, art, and archeology. Hahm.

H125 U 5
The Romans
W. 2 2-hr. cl.
Prereq.: Open only to Freshman Honors Scholars and freshmen enrolled in the Honors Program of a college; permission of Dept.
Discussion of the Roman achievement in politics, literature, architecture, law, and education. Schumaker.

210 (510) U 3
Classical Background of Scientific Terminology
A, W, Sp. 3 cl.
Study of technical and scientific terms from Greek and Latin sources; roots, word elements, word formation, analysis; helpful in medical, biological, and kindred studies.

220 (520) U 5
Greek Literature in Translation
A, W, Sp. 3 cl.

221 (521) U 5
Latin Literature in Translation
A, W, Sp. 5 cl.

222 (522) U 5
Classical Mythology
A, W, Sp. 5 cl.
Not open to students with credit for 122.

224 (524) U 3
Classical Civilization: Greece
Sp. 3 cl.
Not open to students with credit for 120.
A survey of ancient Greek civilization, concentrating upon important facets of literature, history, art, and archeology.

225 U 3
Classical Civilization: Rome
Su, A. 3 cl.
Not open to students with credit for 121.
A survey of the civilization of ancient Rome, concentrating upon important facets of literature, history, art, and archeology. Babcock.
Comparative Literature and Languages

Office: 322 Derby Hall, 154 North Oval Drive

Mr. Wayne Lawson (Acting Chairman); Professors Haber (Emeritus) and Rodgers (Emeritus); Assistant Professor Burkman; Instructor Rodriguez.

101 (401) U 3
Man Views Himself Through Literature: Social and Individual Man
A.
H101 (honors) may be available to students enrolled in a college honors program, 1st or 2nd yr. standing only. 101, 102, and 103 provide a sequence but may be taken independently. Development of Greek ideas and ideals from Homer to Plato: great books of the western world and the part they play in the development of modern European and American culture.

102 (402) U 3
Man Views Himself Through Literature: Religious and Secular Man
W.
1st or 2nd yr. standing only. H102 (honors) may be available to students enrolled in a college honors program. 101, 102, and 103 provide a sequence but may be taken independently. Virgil, Lucretius, Dante, Cervantes: great books of the western world and the part they play in the development of modern European and American culture.

103 (403) U 3
Man Views Himself Through Literature: Rational and Passionate Man
Sp.
1st or 2nd yr. standing only. H103 (honors) may be available to students enrolled in a college honors program. 101, 102, and 103 provide a sequence but may be taken independently. Chaucer, Milton, Moliere, Shakespeare, Goethe: great books of the western world and the part they play in the development of modern European and American culture.

Computer and Information Science

Office: 105 Caldwell Laboratory, 2024 Neil Avenue

Professors Yovits (Chairman), Hang, Kears, McGhee, Popinsky, Reeves, Rothstein, and Saltzer; Associate Professors Ernst, Fouk, Liu, and Rush; Adjunct Associate Professor Wigington; Assistant Professors Chandrasekaran, Kerr, Mathis, Petrarca, Randels, Reeker, and White.

240 U 3
Computer Programming and Data Processing I
Su, A, W, Sp. 3 cl.
Prereq.: Math. 116, 121, or 150.
Not open to students with credit for 241.

Introduction to programming language; laboratory experience with computers; emphasis on business and statistical applications.

241 U 5
Digital Computer Programming I
Su, A, W, Sp. 5 cl.
Prereq.: Math. 152.
Not open to students with credit for 240.
Introduction to programming language; laboratory experience with computers; emphasis on scientific applications.

294 U 1-5
Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs. Students are given an opportunity to pursue special studies not otherwise offered.

440 U 3
Computer Programming and Data Processing II
Su, A, W, Sp. 3 cl.
Prereq.: 240, 241, or Engr. Gr. 200.
Not open to students with credit for 540.
Good working knowledge of programming and programming languages, with emphasis on applications in business and the humanities; laboratory use of computers.

494 U 1-5
Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs. Designed to give the student an opportunity to pursue special studies not otherwise offered.

505 U G 5
Fundamental Concepts of Computer and Information Science
A, W. 5 cl.
Prereq.: 240, 241, or Engr. Gr. 200.
Introduction to the fundamental concepts of computer and information science with a survey of the principal areas of activity in the discipline.

541 U G 5
Survey of Numerical Methods
Su, A, W, Sp. 5 cl.
Prereq.: 240, 241, or Engr. Gr. 200; concur. Math. 255 or 556.
Not open to students with credit for 640.
Basic techniques of numerical analysis: finite differences, interpolation, solution of equations, integration, difference and differential equations; laboratory use of computers.

542 U G 3
Introduction to Computing in the Humanities
Su, Sp. 3 cl.
Prereq.: Junior standing.
Use of non-numerical programming language for editing and collating texts, for forming indices and concordances, and for studies of style, attribution, and literary influence.
Computer and Information Science

543 U G 5
Digital Computer Programming II
Su, A, W, Sp. 5 cl.
Prereq.: 241, 440, or Engr. Gr. 200.
Expert use of programming language; design and use of source language subroutines; input-output facilities; introduction to symbolic assembly language.

550 U G 5
Introduction to Information Storage and Retrieval
A, W, Sp. 5 cl.
Prereq.: 240, 241, or Engr. Gr. 200.
Introduction to fundamental concepts of information storage and retrieval; discussion of existing systems and their shortcomings; emphasis on current research and new developments.

594 U G 1-5
Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Designed to give the student an opportunity to pursue studies not otherwise offered.

610 U G 5
Numerical Analysis I
A, Sp. 5 cl.
Prereq.: 240, 241, or Engr. Gr. 200; Math. 205 or 556, and Math. 550; or grad. standing and permission of instructor.
Mathematical analysis of standard numerical methods for interpolation, approximation, and quadrature; numerical solution of nonlinear equations and ordinary differential equations.

641 U G 5
Digital Computer Programming III
Su, A, W, Sp. 5 cl.
Prereq.: 543 or permission of instructor.
Symbolic assembly language and macro assembler programming; organization and data flow in typical computers.

642 U G 5
Numerical Analysis II
W. 5 cl.
Prereq.: 541 or 640, and Math. 571 or 601.

643 U G 5
Linear Programming
A. 5 cl.
Prereq.: 541 or 640, and Math. 571 or 601.
Theory of linear programming methods; problem formulation; study of principal features of L/P codes; post-optimal analysis.

645 U G 5
Numerical Solution of Differential Equations
Sp. 5 cl.
Prereq.: 640, or 541 and permission of instructor.
Ordinary differential equations; Milne's method, Simpson's method, Runge-Kutta methods; two-point boundary value problems; experiments using computers.

675 U G 5
Digital Computer Organization
Su, W. 5 cl.
Prereq.: 543.
Not open to students with credit for 650.
Boolean algebra, simplification of switching circuits, memory elements, design of arithmetic units and control units, error-correcting codes.

693 U G 1-5
Individual Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Students are given an opportunity to pursue special studies not otherwise offered.

705 U G 1-5
Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Students are given an opportunity to pursue special studies not otherwise offered.

712 U G 5
Introduction to Computer and Information Science
A, Sp. 5 cl.
Prereq.: Grad. standing in Comp. and Info. Sc. or permission of instructor.
Introduction to the broader applications of information theory as concerned with computer and information science.

720 U G 5
Man-Machine Interface
W. 5 cl.
Prereq.: Math. 254 and Psychol. 620.
Information continuity and system operation; information display and regulation; role and usage of operator in information acquisition and transmissions; automation, machine augmentation of operator function.

725 U G 3
Basic Concepts of Self-Organizing Systems
Sp. 3 cl.
Prereq. or concur.: Math. 521.
Basic principles of adaptive systems; examples drawn from game-playing programs, homeostatic mechanisms, and self-regulatory systems.
726 UG 3
Theory of Automata I
Sp. 3 cl.
Prereq.: Grad. standing or permission of instructor.
Introduction to the mathematical theory of automata; mathematical background, various types of abstract
machines, and decomposition theory of finite automata.

727 UG 3
Theory of Automata II
Su. 2 cl.
Prereq.: 726.
Continuation of 726; includes recursive and partial
recursive functions, complexity of computation, regular expressions, and Turing machines.

728† UG 3
Theory of Automata III
Sp. 3 cl.
Prereq.: 727.
Continuation of 727; artificial languages, context-free and context-sensitive languages, stochastic automata,
and random processes in sequential machines.

730 UG 5
Basic Concepts in Artificial Intelligence
W. 5 cl.
Prereq.: 706; prerequisite or concur. Math. 521.
Basic concepts of artificial learning and intelligent systems; theories, contemporary models; implementation by hardware and computer simulation.

740 UG 5
Computer Systems Programming
W. 5 cl.
Prereq.: 641.
Input-output buffering, time-sharing, dynamic storage assignment, symbol manipulation, sorting, merging,
and related topics; classroom exercises involve use of computers.

Mathematical Foundations of the Design
and Use of Automatic Systems I, II, III
(See Math. 741, 742, and 743.)

746 UG 5
Advanced Numerical Analysis
Sp. 5 cl.
Prereq.: 642 and 645; or permission of instructor.
A careful treatment of some of the principal numerical algorithms; complete error analysis; emphasis on recent developments.

750 UG 5
Modern Methods of Information Storage and Retrieval
A, Sp. 5 cl.
Prereq.: 550, or grad. standing and permission of instructor.
Fundamental and modern concepts of storing and retrieving information; current problems and problem solutions.

751 UG 3
Fundamentals of Document-Handling Information Systems
W. 3 cl.
Prereq.: 750.
Fundamentals of information systems: types of systems; design principles; inputs; storage and maintenance; outputs; vocabulary control; monitoring and management; performance evaluation.

752 UG 4
Analysis and Synthesis of Information Systems
Sp. 3 cl., 1 2-hr. lab.
Prereq.: Math. 521.
An introduction to the methodology and techniques of the design and digital-computer simulation of deterministic and stochastic information processing systems; examination of several important contemporary simulation studies.

753 UG 5
Theory of Indexing
W. 5 cl.
Prereq.: 750.
Purposes of indexes; ordering methods; types of indexes; human and automatic indexing; vocabulary control; coding of information; reliability; compilation and evaluation.

754 UG 5
Language Processing for Information Storage and Retrieval
Sp. 5 cl.
Prereq.: 750.
Aspects of natural and artificial language processing and its interaction with information storage and retrieval; emphasis on the current state of the art.

755 UG 5
Programming Languages
Sp. 5 cl.
Prereq.: 641.
Theory and design of assemblers, compilers, and translators for digital computers; comparison of various procedure-oriented languages; implementation techniques.

756 UG 5
Compiler Design and Implementation
A. 5 cl.
Prereq.: 755.
Analysis of source language and generation of efficient object code, operator and operand stacks, subroutine and function compilation, and optimization techniques; students will write a simple compiler.

760 UG 3
Selected Topics in the Mathematics of Information Handling I
A. 3 cl.
Prereq. or concur.: Math. 521 and 571.
Repeatable to a maximum of 6 cr. hrs.
Elements of mathematical theories underlying deterministic and stochastic information systems along with associated mathematical techniques.
761 U G 3
Selected Topics in the Mathematics of Information Handling II
W. 3 cl.
Prereq.: or consen., Meth. 521 and 571.
Continuation of 760; elements of mathematical theories underlying deterministic and stochastic information systems along with associated mathematical techniques.

775 U G 5
Advanced Computer Organization
A. 5 cl.
Prereq.: 641, and 650 or 675.
Specification of microprograms; number representation and arithmetic operations; computer organization and input-output organization.

793 U G 1-5
Individual Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
The individual student is given an opportunity to pursue special studies not otherwise offered.

794 U G 1-5
Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Students are given an opportunity to pursue special studies not otherwise offered.

805 G 3-5
Information Theory in Physical Science
W. 3-5 cl.
Prereq.: 705 or permission of instructor.
Logical structure of measurement and communication, resulting common areas of information theory and physical science; informational nature of organization; informational generalization of physical entropy, applications.

806 G 3-5
Information Theory and Models of Natural Complex Systems
Sp. 3-5 cl.
Prereq.: 805 or permission of instructor.
Extension of 805 to complex systems like automata, their physical realization as "well informed heat engines"; possibilities for modeling complex natural behavior (biological, social, etc.).

812* G 5
Computer and Information Science Research Methods
Sp. 4 cl., 1 2-hr. lab.
Prereq.: Math. 521 and 522.
Research strategy, statistical evaluation, design, analysis, and interpretation of data obtained from information systems experimentation.

Advanced Engineering Psychology
(See under Psych. 816.)

820 G 3
Computational Linguistics
Su, Sp. 3 cl.
Prereq.: 720 or Ling. 601, and Math. 254.
Repeatable to a maximum of 6 cr. hrs.
Mathematical and computational techniques in the study of language: theoretical foundations and applications.

835 G 3
Pattern Recognition
A. 3 cl.
Prereq.: 705 and Math. 521.
Conceptual background, decision-making processes in pattern recognition, applications, relations to other fields.

845 G 5
Numerical Solution of Partial Differential Equations
A. 5 cl.
Prereq.: 642 and 645.
Numerical solution of partial differential equations by finite-difference methods; treatment of parabolic, hyperbolic, and elliptic equations; consistency, convergence, and stability considerations.

850 G 5
Theory of Information Retrieval I
W. 5 cl.
Prereq.: 543 and 753.
Correlation of information retrieval theory and practice into a unified theory of information retrieval; existing and proposed retrieval systems will be examined and evaluated.

851 G 3
Theory of Information Retrieval II
Sp. 2 cl., 1 2-hr. lab.
Prereq.: 850.
Data processing techniques, modelling of retrieval systems, and feedback mechanisms; algorithms, system models, and computer programs will be prepared to demonstrate the information retrieval process.

855 G 5
Formal Languages
W. 5 cl.
Prereq.: 720 and 755.
Application of formal language theory to syntactic analysis of programming languages, tradeoffs between language and processor features; storage and time considerations in parsing; undecidability.

865 G 3
Seminar on Socio-Psychological Aspects of the Information Sciences
W. 3 cl.
Prereq.: Permission of instructor.
Ecological, organization, interpersonal, and intrapersonal aspects of information, production, exchange, and use.
889  G 2-5
Advanced Seminar in Computer and Information Science
Prereq.: 2nd qtr. grad. standing in Compu. and Info. Sc. or permission of instructor.
Repeatable to a maximum of 20 cr. hrs.
Consideration of selected topics in computer and information science and topics related to the theory and application of the information science.

899  G 1-5
Interdepartmental Seminar
Repeatable to a maximum of 25 cr. hrs.
(See under Interdepartmental Seminars.)

994  G 1-5
Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 10 cr. hrs.
Students are given an opportunity to pursue special studies not otherwise offered.

999  G Arr.
Research
Research for thesis or dissertation purposes only.

Dairy Science
Office: 116 Plumb Hall, 735 Stadium Drive.

Professors Van-Damark (Chairman), Brakel, Conrad, Fechheimer, Gilmore (Associate Chairman, Wooster), Harvey, Hibbs, Ludwick, McGrew, Porter, Porterfield, and Staubus; Associate Professors Barr, Gomez, Kauser, and Taylor; Assistant Professors Allaire, Brum, Hines, Palmquist and Rausch; Instructors Fuller, Jacquemin, Neuhardt, Rader, and Sechrist.

Domestic Animals in the Service of Man
(See Animal Sc. 100.)
(Offered in cooperation with Depts. of Dairy Sc. and Poul. Sc.)

GENERAL PREREQUISITES FOR COURSES NUMBERED 200
Unless otherwise indicated, the prerequisites for 200-level courses are 45 cr. hrs. in courses numbered 100-199.

201  (401) U 5
Fundamentals of Dairy Science
A, W. 3 cl., 2 2-hr. lab.
The production phases of the dairy industry and the physiological systems of dairy animals. Erkel.

207  (507) U 3
Dairy Cattle Type Evaluation
Sp. 1 2-hr. lab., 1 4-hr. lab.
Prereq.: 201 and 15 cr. hrs. in Biological Sciences.
Dairy breed type standards and their application to herd improvement. Kauser. Fee.

GENERAL PREREQUISITES FOR COURSES NUMBERED 300 AND 400
Unless otherwise indicated, the prerequisites for 300 and 400-level courses are 50 cr. hrs. in college courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-199.

340  (504) U 5
Dairy Herd Management
W. 3 cl., 2 2-hr. lab.
Prereq.: 201 and Animal Sc. 430.
Problems and practices concerned with efficient production of milk and successful operation of a dairy herd. Kauser.

420  (520) U 5
Principles of Animal Improvement
A, W, Sp. 3 cl.
Prereq.: Animal Sc. 100, Math. 150 or equiv., and Genetics 314.
Not open to students with credit for Animal Sc. 420 or Poul. Sc. 420.
(Cross-listed in the Depts. of Animal Sc. and Poul. Sc.)
An introduction to the methods available for bringing about genetic change in farm animals. Fechheimer, Jaap, and Swiger.

430  U 5
Principles of Animal Nutrition
Su (1st term), A, W, Sp. 4 cl., 1 2-hr. lab.
Prereq.: Chem. 102 or 122 and Math. 150 or equiv.
Not open to students with credit for Animal Sc. 430 or Poul. Sc. 430.
(Cross-listed in the Depts. of Animal Sc. and Poul. Sc.)
A study of fundamental principles of nutrition in mammals and birds. Cline and Tyznik.

GENERAL PREREQUISITES FOR COURSES NUMBERED 500
Unless otherwise indicated, the prerequisites for 500-level courses are 20 cr. hrs. in courses numbered 200 or higher in the same discipline numbered 200 or higher, or 10 cr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 200 or higher in specified allied disciplines; or baccalaureate degree.

Marketing Dairy Products
(See Agr. Econ. 526.)
(Offered in cooperation with the Dept. of Dairy Sc.)
935 (701) U 3 or 5
Individual Studies
H393 (honors) may be available to students enrolled in a college honors program or eligible for enrollment.
Prereq.: Permission of instructor.
Special assignments and elementary research; students elect problems after conference with the instructor in charge.

GENERAL PREREQUISITES FOR COURSES NUMBERED 600
Unless otherwise indicated, the prerequisites for 600-level courses are 15 cr. hrs. in courses in the same discipline numbered 300 or higher, or 10 cr. hrs. in courses numbered 300 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 300 or higher in specified allied disciplines.

610 U 3
Physiology of Lactation
A. 2 2-hr. cl.
Prereq.: Vet. Physiol. 211 and 20 cr. hrs. of Dairy Sc., Animal Sc., or vertebrate biology.
Not open to students with credit for Animal Sc. 610.
(Cross-listed in the Dept. of Animal Sc.)
The physiological, endocrine, nutritional, and environmental factors influencing the synthesis and ejection of milk. Barr and Porter.

612 U 3
Physiology of Reproduction and Growth
Sp. 3 1-hr. lec.
Prereq.: Vet. Physiol. 211 and 20 cr. hrs. of Dairy Sc., Animal Sc., or vertebrate biology.
Not open to students with credit for Animal Sc. 612.
(Cross-listed in the Dept. of Animal Sc.)
Physiology of the reproductive system and of growth and development in farm animals; factors influencing reproductive performance. Ludwig.

613 (614) U 3
Laboratory in Reproductive Physiology and Artificial Insemination
Sp. 2 2-hr. lab.
Prereq. or concurr. 612.
Not open to students with credit for Animal Sc. 613.
(Cross-listed in the Dept. of Animal Sc.)
Comparative anatomy and physiology of reproduction of farm animals; physiological bases for the use of artificial insemination in the research laboratory and in the field. Ludwig. Fee.

631 U 5
Nutrition and Feeding of Ruminant Animals
A, W, Sp. 4 cl., 1 2-hr. lab.
Prereq.: 430 or equiv.
Not open to students with credit for Animal Sc. 631.
(Cross-listed in the Dept. of Animal Sc.)
The nutrition of dairy cattle, beef cattle and sheep; principles and practices. Tzyniak.

640 U 5
Evaluation and Integration of Research for Dairy Operations
Sp. 5 cl.
The integration of scientific principles to maximize efficiency in dairy operations. Braekel.

694 U G 3-5
Group Studies
Prereq.: Permission of instructor.
Revealed to a maximum of 10 cr. hrs.
Special assignments and advanced research for groups; problems assigned after consultation with the instructor in charge.

GENERAL PREREQUISITES FOR COURSES NUMBERED 700
Unless otherwise indicated, the prerequisites for 700-level courses are 15 cr. hrs. in courses in the same discipline numbered 400 or higher, plus additional specified course(s) numbered 600 or higher.

710 (812) U 3 or 5
Advanced Reproductive Physiology
Sp. 2 2-hr. cl.
Prereq.: 612 and acceptable courses in Physiol., Anat., and Biochem.
Not open to students with credit for Animal Sc. 710.
(Cross-listed in the Dept. of Animal Sc.)
Recent advances in research in mammalian reproduction; optional individual research experience in reproductive problems with small and large mammals for additional credit. Gomes and VanDemark.

720 U G 5
Genetics of Animal Populations
W. 5 cl.
Prereq.; 420 or Genetics 630 and 10 cr. hrs. in Math.
Not open to students with credit for Animal Sc. 720 or Poult. Sc. 720.
(Cross-listed in the Depts. of Animal Sc. and Poult. Sc.)
Theory and practice of analyzing and altering the genetic composition of animal populations. Swiger.

GENERAL PREREQUISITES FOR COURSES NUMBERED 800 AND 900
Unless otherwise indicated, the prerequisites for 800 and 900-level courses are 30 cr. hrs. in courses in the same discipline, or 20 cr. hrs. in the same discipline, plus 25 cr. hrs. in specified allied disciplines.

800 (801) G 1
Seminar

810 (840) G 3
Advances in Physiology of Domestic Animals
A, W, Sp. 4-hr. cl.
Prereq.: Permission of instructor and acceptable courses in Physiol., Anat., and Biochem.
Not open to students with credit for Animal Sc. 810 or Poult. Sc. 810.
(Cross-listed in the Depts. of Animal Sc. and Poult. Sc.)
810.01† Adrenal Function
A.
Brown and Gomes.
810.02† Endocrinology of Reproduction
W.
Gomes.
810.03† Immunology and Immunogenetics
Sp.
Hines.
810.04† Thyroid and Parathyroid Function
A. Hibbs.
810.05* Mammalian Germ Cells
W. VanDemark.
810.06* Biometry and Animal Performance
Sp. Ludwig.

820  G 3
Current Topics in Animal Genetics
3 cr.
Prereq.: Acceptable courses in Animal Genetics, Math., and Statistics.
Repeatability to a maximum of 12 cr. hrs.
Not open to students with credit for Animal Sc. 820 or Poul. Sc. 820.
(Cross-listed in the Depts. of Animal Sc. and Poul. Sc.)
820.01 Selection Index Theory
Sp. Harvey.
820.02* Non-additive Genetic Variance
W. Harvey.
820.03* Polymorphic Systems
820.04* Simulation of Genetic Systems
W.
820.05† Cytogenetics of Animal Populations
W. Fechheimer.
820.06† Physiological Indices in Animal Breeding
A. Jaap.
820.07† Genetics of Threshold Characters
Sp. Fechheimer, Harvey, Jaap, and Swiger.

830  G 3
Advanced Studies in Nutrition
A, W, Sp. 3 or 4 cr.
Prereq.: Permission of instructor.
Not open to students with credit for Animal Sc. 830 or Poul. Sc. 830.
(Cross-listed in the Depts. of Animal Sc. and Poul. Sc.)
830.01† Energy
A. Conrad.
830.02† Minerals
W. Cline.
830.03† Proteins
Sp. Naber.
830.04* Vitamins
A. Tyznik.
830.05* Lipids
W. R. R. Johnson.
830.08* Laboratory Methods in Nutrition
Sp. Purser.
830.07† Rumen Microbiology
Su. Dehority.

885  (714) G 5
Research Principles and Methods
Su, Sp. 3 cr., 1 4-hr. lab.
Prereq.: Genetics 650, 8 cr. hrs. in Math., and 2 qtrs. grad. study.
Survey and analysis of research in dairy and animal science, literature reviews, collection of data,
preparation of bibliographies, and presentation of reports. Gilmore and VanDemark.

888  G 1
Interdepartmental Seminar
in Nutrition and Food Technology
Sp.
(See under Interdepartmental Seminars.)

993  (701) G 3 or 5
Individual Studies
Exploratory research and advanced assignments; students elect problems after conference with
the instructor in charge.

999  (950) G Arr.
Research
Research for thesis or dissertation purposes only.

Dairy Technology
Office: 122 Vivian Hall, 2121 Fyffe Road
Professors Gould (Chairman), Harper, Kristoffersen, and Slatter; Associate Professors Hansen, Mikolajcz, and Vakaleris; Assistant Professors Blaisdell, Hiseljo, and Kenyon; Instructor Lindamood.

GENERAL PREREQUISITES FOR COURSES
NUMBERED 200
Unless otherwise indicated, the prerequisites for 200-level courses are 45 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-199.

201  (401) U 5
Fundamentals of Dairy Foods
and Their Industries
Sp. 3 cr., 2 2-hr. lab.
Scope, trends, and practices of the dairy foods industry; industrial dairying and the agricultural complex; characteristics of milk and dairy-related foods. Lindamood. Fee.

289  (415) U 3
Dairy Foods Industries Apprenticeship
Open only to students majoring in Dairy Tec.
Ten weeks practical experience or equivalent; in an approved processing plant; written report required. Kristoffersen.
GENERAL PREREQUISITES FOR COURSES NUMBERED 300 AND 400

Unless otherwise indicated, the prerequisites for 300 and 400-level courses are 90 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed. 1; or specified course(s) numbered 100-299.

Fundamentals of Food Engineering
(See Agr. E. 310.)
(Of offered in cooperation with the Dept. of Dairy Tech.)

411 (520) U 3
Sensory Evaluation and Selection of Dairy Foods
Sp. 3 2-3 hr. labs.
Prereq.: 201 or equiv. in depts. offering degrees in Food Tech.
Fundamentals of sensory perception; evaluation of dairy foods; panel selection and training; analysis and market application of results; products standards and grades. Kristoffersen. Fee.

Refrigeration Engineering in the Food Industry
(See Agr. E. 411.)
(Of offered in cooperation with the Dept. of Dairy Tech.)

489 (515) U 3
Field Studies of Industrial Problems
Open only to students majoring in Dairy Tech.
Ten weeks in-plant study of industrial problems in approved dairy foods organizations; written report required. Kristoffersen.

493 (701) U 3-5
Individual Studies
Su, A, W, Sp. 9-, 12-, or 15- hr. lab.
H93 (honors) may be available to students enrolled in a college honors program or eligible for enrollment.
Prereq.: Junior standing.
Individual study course to permit undergraduate students to explore in depth selected areas of dairy technology.

GENERAL PREREQUISITES FOR COURSES NUMBERED 500

Unless otherwise indicated, the prerequisites for 500-level courses are 15 cr. hrs. in courses in the same discipline numbered 200 or higher or 10 cr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 200 or higher in specified allied disciplines; or baccalaureate degree.

521 (601) U G 3
Dairy Foods Standards and Analysis
A. 3 cl.
Prereq.: 14 cr. hrs. Chem.
Not open for graduate credit to majors in Dairy Tech.
The modern dairy foods laboratory; chemical characteristics and analysis of milk and dairy-related foods; evaluation and utilization of analytical methods; regulations, standards and agencies. Hidalgo.

522 (602) U G 3
Dairy Foods Standards and Analysis: Laboratory
A. 1 cl., 2 3-hr. lab.
Prereq. or concur.: 521.
Not open for graduate credit to majors in Dairy Tech.
Application of modern analytical methods to dairy foods; comparison and interpretation of results; laboratory project studies and technical report preparation. Hidalgo. Fee.

Marketing Dairy Products
(See Agr. Econ. 526.)
(Of offered in cooperation with the Dept. of Dairy Tech.)

594 U 3-5
Group Studies
Prereq.: Jr. standing.
Repeatable to a maximum of 10 cr. hrs.
Intensive study of selected areas in dairy technology not provided in other courses and appropriate to the needs of the students.

GENERAL PREREQUISITES FOR COURSES NUMBERED 600

Unless otherwise indicated, the prerequisites for 600-level courses are 15 cr. hrs. in courses in the same discipline numbered 300 or higher, or 10 cr. hrs. in courses numbered 300 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 300 or higher in specified allied disciplines.

601 U G 3
Advances in Dairy Foods
Su. 1st term. 3 3-hr. cl.
Prereq.: Advanced undergrad. or grad. standing.
Not open to majors in Dairy Tech.
Basic food components and their properties, changes in the dairy foods industry and consumer habits, food formulations; nutritional, health, sanitation, and quality aspects. Gould and Kristoffersen.

Food Engineering Design and Control
(See Agr. E. 611.)
(Of offered in cooperation with the Dept. of Dairy Tech.)

631 (603) U G 3
Fluid Dairy Foods
W. 3 cl.
Prereq.: Agr. E. 310.
Science, engineering and economic principles of unit operations for fluid milk and related dairy foods; products properties; quality control; public health aspects. Harper.

632 (604) U G 3
Fluid Dairy Foods: Laboratory
W. 1 cl., 2 3-hr. labs.
Prereq.: 631 and Agr. E. 310.
Application of unit processes in the fluid milk and related dairy food industry; equipment use and production planning; processing and production control; special products. Harper. Fee.

634 (626) (627) U G 5
Lipid and Fermented Concentrated Dairy Foods
Sp. 3 cl., 2 3-hr. labs.
Prereq.: 631 and 632.
Chemical, physical and microbiological phenomena as related to lipid foods, cheese, and similar products; application of engineering, processing and business principles. Kristoffersen. Fee.
Concentrated and Frozen Dairy Foods
A. 3 cl., 2 3-hour labs.
Prereq.: Agr. E. 411.
Unit operations in concentration and freezing; application of science, engineering and management to concentrated and frozen dairy and dairy-type foods. Vakaleris. Fee.

Individual Studies
Su, A, W, Sp. 9-, 12-, or 15-cl. lab.
H933 (honors) may be available to students enrolled in a college honors program or eligible for enrollment.
Prereq.: Dairy Tech. 4th yr. standing and permission of instructor.
Repeatable to a maximum of 10 cl. hrs.
Individual project studies of current problems; planning, conducting, and reporting research.

Seminar
A. 3 cl.
Prereq.: Dairy Tech. 4th yr. standing.
Not open for grad. credit to majors in Dairy Tech.
Leading research workers and their contributions; review, interpretation, and significance of current research; preparation and oral presentation of technical papers. Gould and Harper.

Technical Control of Dairy Foods
Sp. 3 cl., 2 3-hour labs.
Prereq.: 636.
Not open to students with credit for 623.
Utilization of science and engineering in industrial technical control; application of advanced chemical, physical and microbiological techniques. Harper. Fee.

Management of Dairy Foods Operations
W. 2 3-cl. hr.
Prereq.: 4th yr. standing.
Organized management structure; practices and trends in dairy foods operations; efficiency guidelines; product, materials, and utilities conservation; personnel evaluation and utilization; analysis of current industry problems. Gould.

Group Studies
Repeatable to a maximum of 10 cl. hrs.
Intensive study of selected areas of dairy food science not provided in other courses and appropriate to the needs of the students.

Advances in Dairy Food Science
Prereq.: 723.
Repeatable to a maximum of 15 cl. hrs.
G30.01 Microbiology and fermentation
Su (1st term), W. Harper and Mikolajcik.
G30.02 Proteins and Protein Utilization
Su (1st term), W. Hansen and Harper.
G30.03 Emulsion Systems
Su (1st term), Sp. Vakaleris.
G30.04 Food Engineering
Su (1st term), A. Blaisdell and Harper.
G30.05 Research Methods

Seminar
Graduate student-staff participation in a study of teaching and research trends and opportunities; critical analysis of research approaches, findings, and publications.

Interdepartmental Seminar in Nutrition and Food Technology
Sp.
(See under Interdepartmental Seminars.)

Research: Thesis
Research for thesis purposes only.

Research: Dissertation
Research for dissertation purposes only.

Dance
Office: 2043 Millikin Road
Professor Alkire (Chairman); Associate Professor Blaine; Assistant Professors Currier, Lilly, Patton, Venable, and Wynne; Instructors Dally, Edinger, Kimble, and Kvasnicka.

Techniques and Materials of Dance
A. 5 2-cl. lab.
Prereq.: Permission of chairman.
Required of majors in Dance.
Basic techniques and elementary composition.
112 (412) U 3
Techniques and Materials of Dance
W. 5 2-hr. lab.
Prereq.: Permission of chairman.
Required of majors in Dance.
Continuation of 111.

113 (413) U 3
Techniques and Materials of Dance
Sp. 5 2-hr. lab.
Prereq.: Permission of chairman.
Required of majors in Dance.
Continuation of 112.

138 U 3
Dance in the Twentieth Century
Sp. 3 cl.
Not open to students with credit for 699.
Dance as a performing art in Europe and America;
a survey of major stylistic trends, principal artists and
their works.

190 U 3
Ethnic Dance Forms
Sp. 2 1-hr. lab., 4 1-hr. lab.
Prereq.: 112.
Folk forms as practiced by ethnic groups in selected
cultures.

198 U 1
Dance Workshop
A, W, Sp. 3 hrs. of scheduled workshops and/or
rehearsals.
Required of all majors in Dance.
Repeatable to a maximum of 12 cr. hrs.
Provides experience in dance performance and
production activities; scheduled workshops of students' choreography, lectures, and demonstrations.

214 (414) U 3
Techniques and Beginning Composition
A. 5 2-hr. lab.
Required of majors in Dance.
Continuation of 113.

215 (415) U 3
Techniques and Beginning Composition
W. 5 2-hr. lab.
Required of majors in Dance.
Continuation of 214.

216 (416) U 3
Techniques and Beginning Composition
Sp. 5 2-hr. lab.
Required of majors in Dance.
Continuation of 215.

248 (548) U 3
Reconstruction, Analysis, and Teaching of Folk Dance Forms
A, Sp. 1 cl., 2 2-hr. lab.
Prereq.: 2 qtrs. of modern dance or equiv.
Movement techniques and styles inherent in folk
dance forms with application to teaching.

299 (424) U 2
The University Dance Company
A, W, Sp. 3 or more hrs. of rehearsal.
Prereq.: Admission by audition to students enrolled in Dance Major Curriculum.
Repeatable to a maximum of 12 cr. hrs.
The University Dance Company is a concert
organization performing original and reconstructed
dance works; local and touring performances
scheduled.

438 (538) U 3
Dance Notation I
A. 2 cl., 2 1-hr. lab.
Fundamentals and principles of Labanotation.

439 (539) U 3
Dance Notation II
W. 2 cl., 2 1-hr. lab.
Prereq.: 438 or permission of instructor.
Continuation of 438 with emphasis on reading and
writing scores.

531 (631) U G 3
Theory and Practice of Modern Dance
Sp. 2 cl., 3 lab. hrs.
Prereq.: Permission of instructor.
Foundations for teaching and organizing instructional
extra curricular programs of modern dance in schools and colleges; laboratory problems, lectures,
readings, and discussions.

532 (632) U G 3
Dance Composition
A. 2 1-hr. cl., 4 lab. hrs.
Prereq.: Permission of instructor.
A study of composition based on elements of modern
dance backgrounds and immediate sources of modern art; laboratory problems with criticism, readings, films,
and slides.

533 (633) U 5
Dance Production
W. 2 1-hr. cl., 10 lab. hrs.
Prereq.: Permission of instructor.
A study of the production problems in staging dance
for the theater; lectures, readings, and discussions.

534 U G 3
Dance Repertory Literature I
A. 5 1-hr. lec., 5 1-hr. lab.
Prereq.: 439 or equiv.
The reconstruction of a major dance work scored in
Labanotation and choreographed for large groups. Fee.

535 U G 3
Dance Repertory Literature II
W. 5 1-hr. lec., 5 1-hr. lab.
Prereq.: 439 and permission of instructor.
Performing and writing passage of a dance work
choreographed by an Artist-Dancer in residence, and
preparation of the notations in score form. Fee.
536 U G 3
Dance Repertory Literature III
Sp. 5 1-hr. lect., 5 2-hr. lab.
Prereq.: 537 or permission of instructor.
Directing small-scale dance works scored in
Labanotation and producing works for performance.
Fee.

537 U G 3
Music for Choreography
A. 3 1-hr. lect., 1 2-hr. lab.
Prereq.: 531 or equiv.
Study of music suitable for choreographic purposes
and the various approaches to the use of music in
dance composition.

589 U 2
Directed Teaching Experience in Dance
A, W, Sp. 1 4-hr. lab.
Prereq.: Permission of departmental adviser.
Repeatable to a maximum of 6 cr. hrs.

600 U G 3
Advanced Notation
Su, Sp. 2 cl., 1 2-hr. lab.
Prereq.: 439 or equiv.
Repeatable to a maximum of 9 cr. hrs.
Advanced techniques in movement notation; emphasis
on reading and writing complex scores for
reconstruction.

650 U G 4
Advanced Dance Composition
A. Sp. 2 2-hr. cl., 1 3-hr. lab.
Prereq.: 439, 532 or equiv.
Choreographic problems of groups: duets, trios,
quartets, quintets; analysis of dance works of
recognized artists through films and dance scores
written in Labanotation.

657 U G 3
History of Dance I
A. 3 cl.
A survey of basic dance forms and their functions in
tribal societies, and the ancient civilizations of Egypt,
Greece, and Rome.

659 U G 3
History of Dance II
W. 3 cl.
Survey of dance from the early Christian church
through the Baroque period.

659 U G 3
History of Dance III
Sp. 3 cl.
Development of Western dance in the nineteenth and
twentieth centuries with emphasis on ballet and
modern dance.

6601 U G 3
The Romantic Ballet
Su. A. 3 cl.
Prereq.: Grad. or senior standing and permission of
adviser.

The ballet in France, Russia, and other influential
centers from Neo-Classicism to the end of the
nineteenth century.

693 (701) U G 1-4
Individual Studies in Dance
Prereq.: Grad. or senior standing and permission of
adviser.
Investigation of selected professional problems.

801 G 3-5
Seminar in Dance
Prereq.: 657, 658, and 659.
Repeatable to a maximum of 15 cr. hrs.

802 G 3-5
Choreographic Projects
Prereq.: 650 or equiv.
Repeatable to a maximum of 25 cr. hrs.
Advanced choreographic projects.

994 (820 G) G 3
Problems in Dance
Advanced problems in dance, individual or group
participation.

999 G Arr.
Research in Dance
Research for thesis purposes only.

Dental Hygiene

Office: 303 Dentistry Building, 305 West 12th Avenue
Nancy M. Reynolds, Chairman and Director

Professors: J. R. Wilson (Dean), App, Boucher, Brooks,
Bruce, Cushman, Dew, Heinitz, King, Kuhn, Long,
Marshall, Perrmar, Pettit, W. Postle, Wherry, Williams,
Wise, Woelfel, and Zetterberg; Associate Professors
Beckwith, Blozis, Cavalaris, Conroy, Forreran, Pappas,
Postle, Reynolds, Trippy, and Wallace; Assistant
Professors Fox, Harper, Herr, Hoppenstand, Huffman,
Murphy, Snyder, and Whitacre; Instructors Aloe, Binder,
Huckman, Hogg, Jones, Komives, Kramer, Kumler,
Lucks, Monteith, Mole, Neff, Racey, Rosenbusch,
Spicer, and Walker.

261 (401) U 3
Dental Anatomy
A. 1 cl., 6 lab. hrs.
Prereq.: Dent. Hyg. 1st yr. standing.
The morphology of human teeth and surrounding
structures. Permar.
203 (402) U 2
Dental Anatomy
W. 1 cl., 3 lab. hrs.
Prereq.: Dent. Hyg. 1st yr. standing.
A continuation of 201 on the physiology of human teeth and surrounding structures. Perrin.

223 (403) U 5
Dental Prophylaxis
Sp. 2 cl., 7 lab. hrs.
Prereq.: Dent. Hyg. 1st yr. standing.
The demonstration of and the application of technical procedures for the removal of hard and soft deposits from the surfaces of the teeth. Perrin.

233 (506) U 1
Oral Histology and Embryology
Sp. 1 cl.
Prereq.: Dent. Hyg. 1st yr. standing.
A study of the microscopic anatomy of the teeth and surrounding structures; the development of the teeth, oral cavity, and face. Perrin.

243 (501) U 2
General Pathology
Sp. 2 cl.
Prereq.: Dent. Hyg. 1st yr. standing.
An introduction to general pathology including degenerative changes, inflammation, and repair; a discussion of the more common diseases affecting the human body. Cavalaris.

293 (404) U 1
Oral Hygiene
Sp. 1 cl.
Prereq.: Dent. Hyg. 1st yr. standing.
A study of the formation of deposits on teeth, the maintenance of good oral hygiene, and the prevention of periodontal disease. App.

295 U 1
Survey of Dental Hygiene
A. 1 cl.
Prereq.: Dent. Hyg. 1st yr. standing.
The historical, professional, legal, ethical and preventive aspects of dental hygiene. Wise.

301 (515) U 1
Anesthesia
A. 1 cl. or 3 lab. hrs.
Prereq.: Dent. Hyg. 2nd yr. standing.
The role of the dental hygienist as an assistant in anesthesia; premedication, physiological responses to and pharmacological actions of anesthetic agents; emergency treatment. Snyder.

311 (502) U 2
Dental Nursing
A. 2 cl.
Prereq.: Dent. Hyg. 2nd yr. standing.
A discussion of ways in which the dental hygienist may assist the general practitioner of dentistry or one specializing in any field of dentistry. Reynolds.

312 (503) U 2
Dental Nursing
W. 2 cl.
Prereq.: Dent. Hyg. 2nd yr. standing.
Problems which students encounter in the dental hygiene clinic; practical experience in dental assisting. Reynolds.

313 (504) U 1
Dental Nursing
Sp. 1 cl.
Prereq.: Dent. Hyg. 2nd yr. standing.
A continuation of 312. The dental hygienist's responsibilities to her profession. Reynolds.

321 (508) U 3
Clinical Dental Prophylaxis
A. 9 clinic hrs.
Prereq.: Dent. Hyg. 2nd yr. standing.
Clinical application of principles taught in 223. Reynolds.

322 (509) U 5
Clinical Dental Prophylaxis
W. 15 clinic hrs.
Prereq.: Dent. Hyg. 2nd yr. standing.
A continuation of 321. Reynolds.

323 (510) U 5
Clinical Dental Prophylaxis
Sp. 15 clinic hrs.
Prereq.: Dent. Hyg. 2nd yr. standing.
A continuation of 322. Reynolds.

331 (405) U 1
Materia Medica
A. 1 cl.
Prereq.: Dent. Hyg. 2nd yr. standing.
A study of drugs commonly used in dental practice and correct methods for their use. Reynolds.

335 U 5
Chemistry for Dental Hygienists
W. 8 cl.
Prereq.: Dent. Hyg. 2nd yr. standing.
A survey of general chemical principles and an introduction to fundamental physiological applications of organic chemistry for dental hygiene students. Foreman.

341 U 1
Oral Pathology
A. 1 cl.
Prereq.: Dent. Hyg. 2nd yr. standing.
A study of the clinical manifestations of the common diseases affecting the teeth and their supporting structures. Bruce.

351 (511) U 2
Nursing Techniques for Dental Hygienists
A. 2 cl.
Prereq.: Dent. Hyg. 2nd yr. standing.
A study of the principles of nursing as they apply to the dental hygienist. King.
361 (512) U 2
Oral Radiography
A. 2 cl., or 6 lab. hrs.
Prereq.: Dent. Hyg. 2nd yr. standing.
The theory and technical procedures of oral
radiography. Pappas.

372 (505) U 3
Dental Materials
W. 1 cl., 6 lab. hrs.
Prereq.: Dent. Hyg. 1st yr. standing.
A study of the composition, chemical and physical
properties, manipulation, and uses of various materials
employed in the practice of dentistry. Woelfel.

382 (513) U 2
Oral Hygiene in the Schools
W. 2 cl.
Prereq.: Dent. Hyg. 2nd yr. standing.
The principles involved in effective dental health
education of the general public, especially school
children. Lucks.

383 (514) U 2
Oral Hygiene in the Schools
Sp. 2 cl.
Prereq.: Dent. Hyg. 2nd yr. standing.
A continuation of 382. An application of principles
learned in 382 by actual teaching experience and by
visits to the schools; the history and organization of
dental public health. Lucks.

393 (516) U 2
Office Practices and Economics
Sp. 2 cl.
Prereq.: Dent. Hyg. 2nd yr. standing.
The role of the dental hygienist in dental practice and
the economics involved.

Dentistry

Office: 120 Dentistry Building, 305 West 12th Avenue

Professors J. R. Wilson (Dean), Allison, App, Boucher,
Bruce, Dew, Heintz, Kreider, Long, Marshall, McConnell,
O'Brien, Permar, Pettit, Rosen, Williams, Wise, and
Woelfel; Associate Professors Beckwith, Blodis, Bluff,
Cavalais, Conroy, Dilley, Foreman, Lalonde, Melin,
Pappas, Parrish, Postle, Reynolds, Rule, Russell, Stolt,
Spangenberg, Trippy, Wade, Wallace, Winter, and
Zacher; Assistant Professors Ashelman, Bancroft,
Bazler, Bombach, Boucher, Burns, Carnes, Chandler,
Chapman, Ciendanek, Cline, Cummins, Dageforde,
Deeds, Dierkens, Dunn, Grumpp, Heli, Hinkl,
Hoppenstand, Huffman, Hull, Imhoff, Jeffers, Knouse,
Larrimer, Lotz, Luckhart, McCoy, Metzler, Moore,
Murphy, Phillips, Porter, Rosenblum, Rumbaugh, Sachs,
Skinner, Smith, Snyder, Sutton, Starr, Toole, Troiano,
Turrell, Walton, H. Whitacre and J. Whitacre.

301 P 2
Dental Anatomy
A. 1 cl., 3 lab. hrs.
Prereq.: Dent. 1st yr. standing.
The morphology of human teeth and surrounding
structures. Trippy.

302 P 4
Dental Anatomy
W. 1 cl., 8 lab. hrs.
Prereq.: Dent. 1st yr. standing.
The physiology of human teeth and surrounding
structures. Trippy.

303 P 2
Principles of Occlusion
Sp. 1 cl., 3 lab. hrs.
Prereq.: Dent. 1st yr. standing.
The anatomy, physiology, actions, and functions of the
human masticatory apparatus. Trippy.

305 P 1
Dental Materials
W. 1 cl.
Prereq.: Dent. 1st yr. standing.
A review of physical properties of materials; a study of
dental impression materials, cast materials, and
denture base resins. Woelfel and Dew.

306 P 1
Dental Materials
Sp. 1 cl.
Prereq.: Dent. 1st yr. standing.
Materials used in the restoration of carious teeth,
including dental cements, waxes, plastics, amalgams,
gold foil, and casting gold alloys. Woelfel.

320 P 1
Orientation and History of Dentistry
A. 1 cl.
Prereq.: Dent. 1st yr. standing.
The evaluation of dentistry from the ancient period
through the medieval, colonial, early American, and

325 P 1
Dental Epidemiology I
W. 1 cl.
Prereq.: Dent. 1st yr. standing.
An introduction to the study of mass disease and some
aspects of dental epidemiology. Zacheri.

381 P 4
Complete Prosthodontics
A. 1 cl., 6 lab. hrs.
Prereq.: Dent. 1st yr. standing.
The elemental principles of impressions and jaw
relations and procedures used in the construction of
complete dentures.

382 P 4
Complete Prosthodontics
W. 1 cl., 8 lab. hrs.
Prereq.: Dent. 1st yr. standing.
The principles and practices of arranging artificial
teeth and processing and finishing complete dentures.
Kreider.
386 P 1
Fixed Partial Prosthodontics
Sp. 1 cl.
Prereq.: Dent. 1st yr. standing.
Aims of service; terminology and definitions; correlation with other curriculum areas; indications, contraindications, and factors relating to bridge construction; description of technic laboratory procedures. Cummins.

389 P 5
Removable Partial Prosthodontics
Sp. 1 cl., 8 lab. hrs.
Prereq.: Dent. 1st yr. standing.
An introduction to the principles of design and construction of removable partial dentures. Heintz.

403 P 1
Local Anesthesia
Sp. 1 cl.
Prereq.: Dent. 2nd yr. standing.
The theory, chemistry, and technique of local anesthesia for dental procedures. Hiatt.

404 P 1
Dental Materials
A. 1 cl.
Prereq.: Dent. 2nd yr. standing.

413 P 1
Endodontics
Sp. 1 cl.
Prereq.: Dent. 2nd yr. standing.

431 P 2
Operative Dentistry
A. 1 cl., 3 lab. hrs.
Prereq.: Dent. 2nd yr. standing.
An introduction to the principles of operative dentistry; the theory and techniques for simple cavity preparations. H. Postle and Huffman.

432 P 3
Operative Dentistry
W. 1 cl., 6 lab. hrs.
Prereq.: Dent. 2nd yr. standing.
The theory and technical procedures for the preparation of compound and complex cavities and the use of amalgams and silicate as restorative materials. H. Postle and Huffman.

433 P 3
Operative Dentistry
Sp. 1 cl., 6 lab. hrs.
Prereq.: Dent. 2nd yr. standing.
The theory and technical procedures for the use of gold inlays and gold as restorative materials; preparation for the clinical aspects of operative dentistry. H. Postle and Huffman.

452 P 3
Pedodontics
W. 2 cl., 2 lab. hrs.
Prereq.: Dent. 2nd yr. standing.
Orientation in pedodontics preparatory for clinical assignments; patient management; modified operative procedures in cavity preparation, pulp management, the manipulation of prefabricated materials, and methods of prevention and control of dental caries. Hall.

453 P 2
Pedodontics and Interceptive Orthodontics
Sp. 1 cl., 3 lab. hrs.
Prereq.: Dent. 2nd yr. standing.
Preparation of study casts; construction of orthodontic bands, using different materials and techniques; designing appliances for prevention, interception, or correction of incipient malocclusion. Hall and Williams.

462 P 1
Periodontics
W. 1 cl.
Prereq.: Dent. 2nd yr. standing.
The etiology, pathology, and diagnosis of periodontal disease. App.

463 P 1
Periodontics
Sp. 1 cl.
Prereq.: Dent. 2nd yr. standing.

482 P 2
Complete Prosthodontics
W. 1 cl., 3 lab. hrs.
Prereq.: Dent. 2nd yr. standing.
The principles and practices of the construction of immediate dentures, and of making esthetic denture restorations. Larrimer.

483 P 3
Complete Prosthodontics
Sp. 1 cl., 6 lab. hrs.
Prereq.: Dent. 2nd yr. standing.
The principles and practices of impression making as related to the anatomic, histologic, and physiologic considerations.

484 P 2
Fixed Partial Prosthodontics
A. 1 cl., 3 lab. hrs.
Prereq.: Dent. 2nd yr. standing.
Principles and technical procedures; complete and partial crowns; preparation, fabrication, and casting in gold. Downes.

485 P 3
Fixed Partial Prosthodontics
W. 1 cl., 6 lab. hrs.
Prereq.: Dent. 2nd yr. standing.
Construction of fixed partial restorations utilizing basic types of retainers, fixed and semi-removable connectors, gold and acrylic pontics. Downes.
486 P 3
Fixed Partial Prosthodontics
Sp. 1 cl., 6 lab. hrs.
Prereq.: Dent. 2nd yr. standing.
Construction of fixed partial restoration with basic retainers and connectors and glazed porcelain pontic; fabrication of acrylic jacket crown. Downes.

487 P 3
Removable Partial Prosthodontics
A. 1 cl., 6 lab. hrs.
Prereq.: Dent. 2nd yr. standing.
The relation of the diagnostic aspects of removable partial dentures to their design and construction. Heintz.

489 P 1
Removable Partial Prosthodontics
Sp. 1 cl.
Prereq.: Dent. 2nd yr. standing.
The advanced principles and design of removable partial dentures and their clinical applications. Heintz.

501 P 1
Local Anesthesia and Oral Surgery
A. 1 cl.
Prereq.: Dent. 3rd yr. standing.
The chemistry and pharmacology of local anesthesia and an introduction to the basic principles of oral surgery. Hiatt and Snyder.

502 P 1
Oral Surgery
W. 1 cl.
Prereq.: Dent. 3rd yr. standing.
Theory and technique of basic exodontia and minor oral surgery; postoperative complications and treatment. Hiatt and Snyder.

511 P 1
Endodontics
A. 1 cl.
Prereq.: Dent. 3rd yr. standing.
The rationale and prognosis for endodontic procedures; application of clinical treatment techniques peculiar to endodontics including radiography, intra canal preparations, and root fillings. Marshall.

513 P 2
Endodontics
Sp. 1 cl. 2 clinic hrs.
Prereq.: Dent. 3rd yr. standing.

532 P 4
Operative Dentistry
W. 1 cl., 6 clinic hrs.
Prereq.: Dent. 3rd yr. standing.
Detailed study of restorative materials; indications and contraindications for each; their manipulation and individual requirements in cavity preparation. Beckwith.

533 P 4
Operative Dentistry
Sp. 1 cl., 6 clinic hrs.
Prereq.: Dent. 3rd yr. standing.
Clinical application of the theories and techniques of restoring carious and defective teeth. Beckwith.

540 P G 4
Oral Histology and Embryology
A. 2 cl., 6 lab. hrs.
Prereq.: Anat. 640; Dent. 2nd yr. standing.
Embryology and histology of teeth and surrounding structures and their correlation to the practice of dentistry. Melfi.

541 P G 4
Oral Pathology
A. 3 cl., 3 lab. hrs.
Prereq.: Dent. 3rd yr. standing, 540 and Path. 655.
The histopathologic and clinical study of oral disease processes that are chiefly of local origin. Cavaliris.

542 P G 1
Oral Pathology
W. 1 cl.
Prereq.: Dent. 3rd yr. standing.
The histopathologic and clinical study of oral disease processes that are associated with systemic disease or diseases of specific organ systems. Cavaliris.

545 P 1
Oral Diagnosis and Treatment Planning
W. 1 cl.
Prereq.: Dent. 3rd yr. standing.
The principles and methods of oral diagnosis, with emphasis on the medical and dental history of the patient. Blozis.

546 P 1
Oral Diagnosis and Treatment Planning
Sp. 1 cl.
Prereq.: Dent. 3rd yr. standing.
The interpretation of signs and symptoms, medical laboratory tests, and treatment planning for the patient. Blozis.

547 P 1
Oral Radiography
A. 1 cl.
Prereq.: Dent. 3rd yr. standing.
The theory and operation of radiographic equipment; darkroom procedures; discussion of anatomical landmarks as seen radiographically; introduction of intraoral radiographic technics. O'Brien.
548 P 1
Oral Radiography
W. 1 cl.
Prereq.: Dent. 3rd yr. standing.
Bisection of the angle and long cone techniques used in intraoral radiography; extraoral radiographic techniques. O'Brien.

549 P 1
Oral Radiography
Sp. 1 cl.
Prereq.: Dent. 3rd yr. standing.
Interpretation of radiographic evidence of pathosis; hazards of ionizing radiation. O'Brien.

551 P 1
Pedodontics
A. 1 cl.
Prereq.: Dent. 3rd yr. standing.
Detailed study of materials presented in 452; restorative materials used in pedodontics; use of X-ray in pedodontic practice. Hall.

552 P 1
Clinical Pedodontics
W. 2 clinic hrs.
Prereq.: Dent. 3rd yr. standing.

553 P 1
Clinical Pedodontics
Sp. 2 clinic hrs.
Prereq.: Dent. 3rd yr. standing.
Continuation of 552.

555 P 1
Orthodontics
W. 1 cl.
Prereq.: Dent. 3rd yr. standing.
The etiology and classification of malocclusion, physiology of tooth movement, character of tissues involved. Williams.

556 P 2
Orthodontics
Sp. 2 cl.
Prereq.: Dent. 3rd yr. standing.
Methods and appliances for the correction of malposed teeth. Williams.

560 P 1
Periodontics
A. 1 cl.
Prereq.: Dent. 3rd yr. standing.

561 P 1
Clinical Periodontics
A. 3 clinic hrs.
Prereq.: Dent. 3rd yr. standing.
App.

562 P 1
Clinical Periodontics
W. 3 clinic hrs.
Prereq.: Dent. 3rd yr. standing.
Continuation of 561. App.

563 P 1
Clinical Periodontics
Sp. 3 clinic hrs.
Prereq.: Dent. 3rd yr. standing.
Continuation of 562. App.

572 P 1
Pharmacology
W. 1 cl.
Prereq.: Dent. 3rd yr. standing.
General pharmacology including the origin and methods of development of drugs; basic pharmacy involving prescription writing, the metric and apothecary systems, drug standards, and federal drug legislation and regulation. Hiatt.

573 P 1
Pharmacology
Sp. 1 cl.
Prereq.: Dent. 3rd yr. standing.
The pharmacology of drugs with possible applications to dentistry, including premedications, postmedications, and drugs affecting the autonomic nervous system. Hiatt.

581 P 2
Complete Prosthodontics
A. 1 cl., 2 clinic hrs.
Prereq.: Dent. 3rd yr. standing.
The principles and practices of maxillomandibular relation records, articulating instruments and occlusion.

582 P 3
Complete Prosthodontics
W. 1 cl., 4 clinic hrs.
Prereq.: Dent. 3rd yr. standing.
The principles and clinical practice in the restoration of esthetics and facial expression by artificial dentures.

583 P 3
Complete Prosthodontics
Sp. 1 cl., 4 clinic hrs.
Prereq.: Dent. 3rd yr. standing.
The clinical practice of the complete denture service, including the care of patients after dentures have been inserted.

584 P 1
Fixed Partial Prosthodontics
A. 1 cl.
Prereq.: Dent. 3rd yr. standing.
Venner crowns, dowel and core, temporary coverage; diagnosis and treatment planning; electroplating; clinical applications and practice. Long.
585  P 2
Fixed Partial Prosthodontics
W. 1 cl., 3 clinic hrs.
Prereq.: Dent. 3rd yr. standing.
Elastic impression materials and related technics including use of gypsum products, waxes, tissue retraction, and sectioning methods; clinical applications and practice. Long.

586  P 3
Fixed Partial Prosthodontics
Sp. 1 cl., 6 clinic hrs.
Prereq.: Dent. 3rd yr. standing.
Selection of abutments and retainers, connectors and pontics; additional types of bridgework procedures; clinical applications and practice. Long.

587  P 1
Removable Partial Prosthodontics
A. 1 cl.
Prereq.: Dent. 3rd yr. standing.
Complex problems of removable partial dentures and their clinical application. Heintz.

593  P 1-6
Individual Studies
Individual studies in any of the recognized fields of dentistry or summer clinic.

601  P 2
Physical Diagnosis
A. 1 cl., 2 clinic hrs.
Prereq.: Dent. 4th yr. standing.
History taking; physical evaluation technics; common laboratory analyses; nose, throat, and mouth examinations; physiology of normal and pathologic respiration, heart functions and circulation of blood. Allison and Wallace.

602  P 2
Physical Diagnosis and Anesthesia
W. 1 cl., 2 clinic hrs.
Prereq.: Dent. 4th yr. standing.
Oxygen and carbon dioxide transport; electrolyte and fluid balance; pharmacologic action of sedatives, hypnotics, analgesics, narcotics, intravenous barbiturates, muscle relaxants, inhalation anesthetic agents. Allison and Wallace.

603  P 2
Anesthesia
Sp. 1 cl., 2 clinic hrs.
Prereq.: Dent. 4th yr. standing.
Laryngoscopy, endotracheal intubation, maintenance of anesthesia and management during recovery; management of emergencies; use of fluids, drugs, open and closed cardiac massage techniques, and analeptics. Allison and Wallace.

604  P 2
Oral Surgery
A. 1 cl., 2 clinic hrs.
Prereq.: Dent. 4th yr. standing.
Wound healing, inflammation, infection, their mechanism, diagnosis, and treatment; surgical management of exostosis, hyperplasias, and surgical preparation of the mouth for prosthodontics. Allison and Wallace.

605  P 2
Oral Surgery
W. 1 cl., 2 clinic hrs.
Prereq.: Dent. 4th yr. standing.
Diagnosis and surgical treatment plan for unerupted teeth; incisions, methods for removal of bone, protection for adjacent teeth, hemostatic agents, antibiotics, sutures and suturing. Allison and Wallace.

606  P 2
Oral Surgery
Sp. 1 cl., 2 clinic hrs.
Prereq.: Dent. 4th yr. standing.
Continuation of 605. Diagnosis, surgical treatment, and prognosis for pathologic conditions of the mouth and jaws, of the salivary glands and their ducts, and biopsy for lesions. Allison, Wallace, Ford, Russell, and Snyder.

612  P 2
Clinical Endodontics
W. 4 clinic hrs.
Prereq.: Dent. 4th yr. standing.

613  P 1
Clinical Endodontics
Sp. 2 clinic hrs.
Prereq.: Dent. 4th yr. standing.

621  P 1
Dental Practice Administration
A. 1 cl.
Prereq.: Dent. 4th yr. standing.

622  P 1
Dental Practice Administration
W. 1 cl.
Prereq.: Dent. 4th yr. standing.

623  P 1
Dental Practice Administration
Sp. 1 cl.
Prereq.: Dent. 4th yr. standing.

631  P 5
Operative Dentistry
A. 1 cl., 8 clinic hrs.
Prereq.: Dent. 4th yr. standing.
Review of the basic principles of operative dentistry and their clinical application to special problems. Beckwith and Huffman.
Operative Dentistry
W. 1 cl., 8 clinic hrs.
Prereq.: Dent. 4th yr. standing.
Introduction of special techniques and procedures in operative dentistry and their clinical applications. Beckwith and Huffman.

Operative Dentistry
Sp. 1 cl., 8 clinic hrs.
Prereq.: Dent. 4th yr. standing.
Continuation of 632. Advanced theories, technical procedures, and materials in Operative Dentistry; their value, limitations, and clinical application. Beckwith and Huffman.

Advanced Oncology
A. 1 cl.
Prereq.: Dent. 4th yr. standing.
Dental aspects of oncology including the oral surgical, periodontal, and prosthetic management of patients with oral neoplastic disease and post-treatment morbidity. Cavalaris.

Advanced Oncology
W. 1 cl.
Prereq.: Dent. 4th yr. standing.
Medical aspects of oncology including the diagnosis, treatment and prognosis of cancerous problems and discussion of recent advances in cancer research and etiology. Cavalaris.

Advanced Oncology
Sp. 1 cl.
Prereq.: Dent. 4th yr. standing.
Clinico-pathologic conference pertaining chiefly to neoplastic disease, particularly in the head and neck regions. Cavalaris.

Clinical Oral Diagnosis and Treatment Planning
W. 2 clinic hrs.
Prereq.: Dent. 4th yr. standing.
Blozis.

Clinical Oral Diagnosis and Treatment Planning
Sp. 2 clinic hrs.
Prereq.: Dent. 4th yr. standing.
Continuation of 645. Blozis.

Clinical Oral Radiography
A. 2 clinic hrs.
Prereq.: Dent. 4th yr. standing.
O'Brien.

Clinical Oral Radiography
W. 2 clinic hrs.
Prereq.: Dent. 4th yr. standing.
Continuation of 647. O'Brien.

Clinical Oral Radiography
Sp. 2 clinic hrs.
Prereq.: Dent. 4th yr. standing.
Continuation of 649. O'Brien.

Clinical Oral Radiography
Cl. 2 clinic hrs.
Prereq.: Dent. 4th yr. standing.
The chemistry, indications, actions, and effects of antibiotics and analgesics. Wallace.

Clinical Oral Radiography
Sp. 1 cl., 2 clinic hrs.
Prereq.: Dent. 4th yr. standing.
The chemistry of tranquilizers; indications for their use and their actions; a review of prescription writing. Wallace.

Pedodontics
A. 1 cl., 3 clinic hrs.
Prereq.: Dent. 4th yr. standing.
Diagnosis of pulp conditions of primary and young permanent teeth; techniques for treatment; growth and development pertaining to pedodontics; care of handicapped patients.

Pedodontics
Sp. 2 clinic hrs.
Prereq.: Dent. 4th yr. standing.
Continuation of 661. App.

Pedodontics
W. 2 clinic hrs.
Prereq.: Dent. 4th yr. standing.
Continuation of 662.

Pedodontics
A. 2 clinic hrs.
Prereq.: Dent. 4th yr. standing.
App.
Complete Prosthodontics
A. 1 cl., 4 clinic hrs.
Prereq.: Dent. 4th yr. standing.
The clinical practice of special occlusal problems, temporomandibular joint disturbances, cleft palate and surgical prosthesis.

Clinical Removable Prosthodontics
W. 4 clinic hrs.
Prereq.: Dent. 4th yr. standing.
Heintz.

Clinical Removable Prosthodontics
Sp. 4 clinic hrs.
Prereq.: Dent. 4th yr. standing.
Continuation of 682. Heintz.

Clinical Fixed Partial Prosthodontics
A. 4 clinic hrs.
Prereq.: Dent. 4th yr. standing.
Long.

Clinical Fixed Partial Prosthodontics
W. 4 clinic hrs.
Prereq.: Dent. 4th yr. standing.
Continuation of 684. Long.

Clinical Fixed Partial Prosthodontics
Sp. 4 clinic hrs.
Prereq.: Dent. 4th yr. standing.
Continuation of 685. Long.

Special Problems
Prereq.: Dent. postgrad. or grad. standing.
Repeatable.
Fee.

Advanced Oral Surgery and Anesthesia
Diagnosis and treatment of surgical conditions of the teeth and contiguous structures; advanced techniques in surgery and local and general anesthesia. Allison.

Advanced Orthodontics
Applied osteology and myology in cephalometric morphogenetic interpretations; review of cephalic growth and development factors in normal occlusion; correction of malocclusions and dento-facial malformations. Williams and Wade.

Advanced Periodontics
Diagnosis and treatment of periodontal disease; correlation between the disease of the periodontium and probable systemic diseases, and management of diseases of a purely dental origin. App, Solt.

Advanced Prosthodontics
The diagnosis, treatment, and replacement of missing or lost teeth and parts of the mouth by prosthetic appliances; complete removable partial, or fixed restorations. Boucher, Heintz, Long, and Woelfel.

Advanced Oral Pathology and Diagnosis
The interrelationships of gross microscopic, and clinical pathology; current advances in the field of oral pathology and diagnosis. Cavalieri, Blosz.

Advanced Endodontics

Advanced Pedodontics
Lectures, seminars and clinical practice encompassing all phases of pedodontics and interceptive orthodontics. Pettit and Rule.

Advanced Dental Materials
The science of dental materials. McConnell.

Advanced Oral Histology and Embryology
The principles of histology and embryology applied to the structures in the oral region—their development, morphology, functions, and clinical relationships. Melti.

Advanced Operative Dentistry
Clinical problems in operative dentistry and their correlation with problems in related fields of dentistry; special emphasis on preventive dentistry. Wilson.

Histologic Laboratory Technique
Prereq.: Permission of instructor.

Individual Studies
Prereq.: Permission of instructor.
Repeatable.
Special assignments in advanced phases of dentistry problems; students will elect to work in desired subjects after a conference with the instructor in charge.

Seminar in Dentistry
Prereq.: Dent. grad. standing.
A discussion of recent advances in all branches of dental science; review of original literature. Conroy, Foreman, and Meift. Fee.

Research in Dentistry
Research for thesis purposes only.
Design

Office: 374 Hopkins Fine Arts Center, 128 North Oval Drive

Associate Professor Waitschlaeger (Chairman);
Professors Wood and Zimmer; Associate Professors Butler and Kitts; Assistant Professors Burden, Tetz, Weckerle, and Zeiler; Instructor McIntyre.

160  U 3
Introduction to Design
W.  3 cl.
Not open to students with credit for Fine Arts 160.
Introduction to the history, theory, and practice of design in a technological society. Fee.

250†  U 3
Fundamentals of Design
A.  3 2-hr. labs.
Prereq.: Art 190 or 290, or Fine Arts 190 or 290, or permission of instructor.
Not open to students with credit for Fine Arts 250 or (577).
The application of principles of design in the decorative arts; study of textiles, home furnishings, and other phases of contemporary design.

251  U 5
Design I
A.  5 3-hr. labs.
Prereq.: Design majors.
An introduction to the theory, methods, and practices of design with an emphasis upon methods in inquiry, techniques, and procedures used in design problem solving. Fee.

252  U 5
Design I
W.  5 3-hr. labs.
Prereq.: 251 or Fine Arts 251.
A continuation of 251 with emphasis upon the technical, analytical, and organizational skills required in the design process. Fee.

253  U 5
Design I
Sp.  5 3-hr. labs.
Prereq.: 252 or Fine Arts 252.
A continuation of 252 with emphasis upon three dimensional models, color themes, and applications. Fee.

259  U 3
Typography
A. W. Sp.  3 2-hr. labs.
The principles of typography and their application. Fee.

450  U 5
Design II
A.  5 2-hr. labs.
Prereq.: 253 or Fine Arts 253 and junior standing or Design Area approval; concur. 460.
Not open to students with credit for Fine Arts 450 or (554).
Resolution of design problems in two and three dimensions. Fee.

451  U 5
Design II
W.  5 2-hr. labs.
Prereq.: 450 and 460 or Fine Arts 450 and 460; concur. 461.
Not open to students with credit for Fine Arts 451 or (555).
Resolution of problems in information presentation and communications. Fee.

452  U 5
Design II
Sp.  5 2-hr. labs.
Prereq.: 451 and 461 or Fine Arts 451 and 461; concur. 462.
Not open to students with credit for Fine Arts 452 or (556).
Resolution of problems in visual communications. Fee.

460  U 5
Design II
A.  5 2-hr. labs.
Prereq.: 253 or Fine Arts 253; concur. 450.
Not open to students with credit for Fine Arts 460 or (582).
Application of research and planning techniques required for the solution of industrial design problems; emphasis on structural problems. Fee.

461  U 5
Design II
W.  5 2-hr. labs.
Prereq.: 450 and 460 or Fine Arts 450 and 460; concur. 451.
Not open to students with credit for Fine Arts 461 or (583).
A study of general systems as applied to the design of products and environments. Fee.

462  U 5
Design II
Sp.  5 2-hr. labs.
Prereq.: 451 and 461 or Fine Arts 451 and 461; concur. 452.
Not open to students with credit for Fine Arts 462 or (584).
An integration of design problems comprised of informational products and environmental elements. Fee.

465†  U 5
Space and Enclosure Design
Sp.  1 cl., 5 2-hr. labs.
Not open to students with credit for Fine Arts 465 or (576).
A study of form and order concepts in environmental space and enclosure including exhibition systems and storage problems. Fee.

650†  U 5
Interior Environment I
A.  1 cl., 11 lab. hrs.
Prereq.: 465 and History of Art 212 or Fine Arts 212 and 465.
Not open to students with credit for Fine Arts 650 or (603).
Study of materials and factors peculiar to the field of interior environment; solving of interior problems; practice in the visual presentation of design solutions; field trips.

651 U 5
Interior Environment II
W. 1 cl., 11 lab. hrs.
Prereq.: 650 or Fine Arts 650.
Not open to students with credit for Fine Arts 651 or (604).
Continuation of experience in solving interior environmental problems and presentation; a review of professional practice and ethics.

652 U 5
Interior Environment III
Sp. 2 cl., 4 2-hr. labs.
Prereq.: 650 and 651 or Fine Arts 650 and 651.
Not open to students with credit for Fine Arts 652.
A design thesis necessitating research, visual solutions, and specifications in areas concerning the community environment.

653 U G 4
Space Enclosure Systems
Su, W. 1 cl., 3 lab. hrs.
Prereq.: Senior or grad. standing, permission of instructor.
Repeatable to a maximum of 12 cr. hrs.
Studies in space lattice development and variables of form and proportion of packing cells directed toward application in packaging, space frames, partitioning, and compartment design.

660 U G 5
Design III: Product
A. 5 2-hr. labs.
Prereq.: 452 and 462 or Fine Arts 452 and 462; concur. 693.04 for 5 cr. hrs.
Not open to students with credit for Fine Arts 660 or (609).
A study of materials, construction techniques, and fabrication of products. Fee.

661 U G 5
Design III: Product
W. 5 2-hr. labs.
Prereq.: 660 or Fine Arts 660; concur. 693.04 for 5 cr. hrs.
Not open to students with credit for Fine Arts 661 or (609).
Design problems related to manufacturing processes, materials, and technology. Laboratory practice in planning and design for mass production. Fee.

662 U G 5
Design III: Product
Sp. 5 2-hr. labs.
Prereq.: 661 or Fine Arts 661; concur. 693.04 for 5 cr. hrs.
Not open to students with credit for Fine Arts 662 or (610).
Laboratory practice in research, planning, and design for industrial production. Fee.

665 U G 5
Design III: Visual Communication
A. 5 2-hr. labs.
Prereq.: 452 and 462 or Fine Arts 452 and 462; concur. 693.02 for 5 cr. hrs.
Not open to students with credit for Fine Arts 665 or (635).
Explorations coordinatining graphic media, technology, and techniques in advanced two-dimensional and three-dimensional graphic problems; research and development projects. Fee.

666 U G 5
Design III: Visual Communication
W. 5 2-hr. labs.
Prereq.: 665 or Fine Arts 665; concur. 693.02 for 5 cr. hrs.
Not open to students with credit for Fine Arts 666 or (636).
Continuation of 665. Fee.

677 U G 5
Design III: Visual Communication
Sp. 5 2-hr. labs.
Prereq.: 666 or Fine Arts 666; concur. 693.02 for 5 cr. hrs.
Not open to students with credit for Fine Arts 667 or (637).
Continuation of 666. Fee.

683 U G 2-5
Individual Studies
Prereq.: Permission of instructor.
Each decimal subdivision repeatable to a maximum of 45 cr. hrs.
Advanced study for students in specialized programs.
693.02 Visual Communication Design
693.04 Design
693.08 Space and Enclosure Design

694 U G 2-5
Group Studies
Prereq.: Permission of instructor.
Each decimal subdivision repeatable to a maximum of 15 cr. hrs.
Group studies for students in specialized programs.
694.02 Visual Communication Design
694.04 Design
694.08 Space and Enclosure Design

950 G 3-5
Research Problems in Design
Repeatable to maximum of 45 cr. hrs.
Fee.

993 G 1-5
Individual Studies
Repeatable to a maximum of 45 cr. hrs.
Research in Design: Thesis
Research for thesis purposes only.

Economics

Office: 239 Hagerty Hall, 1775 South College Road

Professors Cunningham (Chairman), Bodenhorn, Bowers (Emeritus), Brunner, Condoide (Emeritus), Deweld, Eason, Fleisher, Harrison, James, Lynn, Miller, Oster, Parnes, Patton (Emeritus), Quantz, Sherman, and Tybout; Adjunct Professor Raskind; Associate Professors Barth, Cameron, Kelley, L’Esperance, McCalmont, Swamy, and Tuttle (Emeritus); Assistant Professors Baitensperger, Botte (Emeritus), Boyd, Brada, Bushnell, Ernest, Goed, Kopecky, Laden, Lindsey, Mattila, Michael, Porter, Singh, Stevens (Emeritus), Stillson, Weicher, and Wipf.

The Department of Economics offers opportunities for special study in the following subfields:
Economic Theory and History of Thought
Economic History
Money, Banking, and Monetary Policy
Government Finance and Expenditure
Quantitative Methods in Economics
Economic Development and Development Planning
International Economics
Structure and Regulation of Industry
Labor Economics
National Security Economics
Soviet Economy
Open Field

200 U 5
Principles of Economics I
Su, A, W, Sp. 5 cl.
H200 (honors) may be available to students enrolled in a college honors program or by permission of dept.
Recommended first course for students who plan to take more than one course in economics.
Not open to students with credit for 201 or 402.
Introduction to economic theory: supply and demand for goods and services; market structure; the distribution of income.

201 (501) U 5
The Economic System
Su, A, W, Sp. 5 cl.
H201 (honors) may be available to students enrolled in a college honors program or by permission of dept.
Not recommended for students who plan to take more than one course in economics.
Not open to students with credit for 200 or 400.
Study of basic characteristics, processes, and institutions of the economic system; significant problems arising in its operations; proposed solutions.

400 U 5
Principles of Economics II
Su, A, W, Sp. 5 cl.
H400 (honors) may be available to students enrolled in a college honors program or by permission of dept.
Prereq.: 200.
Not open to students with credit for 201 or 402.

Continuation of 200; theory of national income determination; economic fluctuations; money; government policy; international economics.

402 (502) U 5
Introduction to Economic Theory
A, W, Sp. 5 cl.
Prereq.: 201 or equiv.
Not open to students with credit for 200 or 400.
Introduction to economic analysis, including the theory of the market; supply, demand, and price determination; income distribution; aggregate income and employment determination.

442 (542) U 5
Elementary Economic Statistics
Su, A, W, Sp. 4 cl., 1 2-hr. lab.
Prereq.: Completion of Math. requirement in college of student’s registration, or Math. 116 and 117 where there is no college Math. requirement.
Discrete frequency distributions; probability and probability distributions; statistical inference including the Bayesian approach; estimation; one-way analysis of variance; simple linear regression and correlation; index numbers. Bushnell, Laden, L’Esperance, Porter, and Staff.

490 U 4
Ghetto Economics
W. 3 cl.
Prereq.: 200 or 201.
Interaction between economic problems and race problems in urban areas.

500 (600) U G 3
Evolution of Economic Thought
Sp. 3 cl.
Prereq.: Either 400, 402 or equiv.
Critical analysis of ideas of great economists, factors which influenced those ideas; their impact upon social and economic development of the modern world. Bodenhorn and Lynn.

501 U G 4
Intermediate Micro-economic Theory
Su, A, W, Sp. 4 cl.
Prereq.: Either 400, 402 or equiv.
Theory of consumer behavior; theory of the firm; costs and production; factor price determination; general equilibrium.

502 U G 4
Intermediate Macro-economic Theory
Su, A, W, Sp. 4 cl.
Prereq.: Either 400, 402 or equiv.; 501 recommended.
Analysis of the determinants of national output, income and employment levels; theory of economic growth and progressive equilibrium in an economy.

506 (606) U G 3
Current Economic Problems
Su. W. 3 cl.
Prereq.: Either 400, 402 or equiv.
Not open to undergrad. and grad. students majoring in Econ.
Examination of current problems; optimum levels of employment; conditions underlying consumer expenditures; savings, investments; inflation, deflation; agriculture, public works, housing; regional development. Cameron.
508  (630)  U  G  4
Comparative Economic Systems
W.  4 cl.
Prereq.: Either 400, 402 or equiv.
Not recommended for students who plan to take 607 and not open to students with credit for 600.
Principles and institutions for economic decision making under capitalism, socialism, communism, and "mixed" systems; comparison of selected countries. Bodenhorn and Eason.

512  (612)  U  G  4
General Economic History
Su, A, Sp.  4 cl.
Prereq.: Either 400, 402 or equiv.
Evolutional changes fundamental to Western development; analysis of the rise of nation-state, commercial and industrial development, and evolution of a market economy. Weicher.

520  (623)  U  G  4
Money and Banking
Su, A, W, Sp.  4 cl.
HS50 (honors) may be available to students enrolled in a college honors program or by permission of dept.
Prereq.: Either 400, 402 or equiv.
Not open to graduate students in Econ.
Organization, operation, and economic significance of our monetary and banking system are discussed with special reference to current conditions and problems. Brunner, Bewaid, Lindsey, Quantius, and Staff.

530  (636)  U  G  4
Government Finance in the American Economy
Su, A, W, Sp.  4 cl.
HS50 (honors) may be available to students enrolled in a college honors program or by permission of dept.
Prereq.: Either 400, 402 or equiv.
Not open to graduate students in Econ.
Analysis of fiscal institutions and decision making in the public sector of the American economy; budget planning and execution; taxation, debt, fiscal policy. Cameron, Lynn, Stocker, Weicher, and Staff.

550  (610)  U  G  4
Economic Development
A.  2 5 hr. cl.
Prereq.: Either 400, 402 or equiv.
Not open to students with credit for 610 or 650.
Empirical and theoretical consideration of long-term economic changes, including changes in industrial structure, technology, and level of national product; emphasis on developing economics. Barth, Michael, Singh, and Stilson.

553  (653)  U  G  3
Population
A.  3 cl.
Prereq.: Either 400, 402 or equiv.
Impact of world population growth upon resources, productive capacities, scales of living, national defense, and international economic relations; critical consideration of population theories and policies. Eason.

559  U  G  4
Economic Development of Latin America
W.  4 cl.
Prereq.: Either 400, 402, or equiv.
Requaint analysis of economic conditions in Latin America and prospects for accelerated economic growth; evaluation of national development strategies and current programs of intra-regional cooperation. Kelley.

559  U  G  4
Economic Development of the Soviet Union and Eastern Europe
Sp.  4 cl.
Prereq.: 400 or 402; 508 or 550 recommended.
Not recommended for students planning to take 608.
Measurement and interpretation of economic performance in the Soviet Union and Eastern Europe; resource development and utilization; international economic relations; strategy for economic growth. Brada and Eason.

560  U  3
International Economic Relations
W, Sp.  3 cl.
Prereq.: Either 400, 402 or equiv.
Not recommended for students who plan to take 665 and 666.
Survey of international economic relations; the basis of world trade; commercial and financial policy, particularly of the United States; and recent international economic organization. James, Michael, Stilson, and Wipf.

563†  U  G  5
Economic Problems of Western Europe
A.  5 cl.
Prereq.: Either 400, 402 or equiv.
Not open to students with credit for 663.
European reconquest; European Economic Community and the Free Trade Area; implications.

570  (671)  U  G  5
Government and Business
A, Sp.  5 cl.
Prereq.: Either 400, 402 or equiv.

576  U  G  4
Transportation Economics
W.  4 cl.
Prereq.: Either 400, 405 or equiv.
Not open to students with credit for 676.
Study of general economic characteristics and government regulation of rail, motor, water, air, and pipeline carriers; consideration of competitive relations between modes of transportation. Boyd and Tybout.

577  U  G  4
Transportation Planning and Coordination
Sp.  4 cl.
Prereq.: 576 or permission of instructor.
Not open to students with credit for 677.
Transportation, local development and industrial location; criteria for public investment in highway, airport, and other transportation facilities. Boyd and Tybout.

580 (668) U G 4
Labor Economics and Industrial Relations
Su, A, W, Sp. 4 cl.
H580 (honors) may be available to students enrolled in a college honors program or by permission of dept.
Prereq.: Either 400, 402 or equiv.
Not open to graduate students in Econ.
Survey of the field of labor economics; trade unionism, collective bargaining, wage determination, employment, unemployment; labor legislation. Barth, Fleisher, Kelley, Mattila, Miller, and Parnes.

581 U G 4
Economics of the Labor Market
Sp. 2-2 hr. cl.
Prereq.: 580 or equiv.
Materials and methods of labor market analysis; the measurement and behavior of unemployment, employers' and employees' labor market behavior; wage determination and labor allocation. Barth, Fleisher, and Parnes.

H599 (700) U 1-15
Honors Course
Open only to students enrolled in the Honors Program of the Colleges of the Arts and Sciences or the College of Administrative Science.
Repeatable to a maximum of 15 cr. hrs., but must be taken for at least 2 qtrs.
Program of readings, conferences, and reports arranged for the student who is a candidate for "Degree with Distinction" in Economics. Fleisher and Staff.

607 (697) U G 4
Economics of Socialism
A. 4 cl.
Prereq.: 501 and 502 or equiv.
Survey of socialist thought and movements; relations of socialist thought to the theory and practice of socialist economics; planning, allocation, pricing, controls. Bodenhorn and Eason.

608 (698) U G 4
Economic Analysis of the Soviet Union and Eastern Europe
Sp. 4 cl.
Prereq.: 501 and 502 or equiv.
Not open to students with credit for 698.
Analysis of the pattern of economic growth and theory, and practice of economic planning in the Soviet Union and Eastern Europe; comparison with Communist China. Eason.

613 (713) U G 5
Economic History of the United States
W. 2-2 hr. cl.
Prereq.: 501, 502, and 512.
General survey from discovery of America to present; European economic background; westward movement and its effects; development of economic institutions in the U.S.

614 (714) U G 5
Economic History of Western Europe
A. 3 cl.
Prereq.: 501, 502, and 512.
General survey from ancient to modern times; interrelations between economic institutions, general culture, and economic thought; modern capitalism; agricultural, commercial, and industrial revolutions in modern times.

625 U G 3
National and International Money Markets
A. 3 cl.
Prereq.: 501 and 520.
Organization, functions, and control of money markets and their submarkets; flow of funds in these markets and investment policies of market participants. Brunner, Baltensperger, and Quantius.

631 (634) U G 4
Federal Finance and Fiscal Policy
A. 4 cl.
Prereq.: 501, 502, and 530; or grad. standing in Econ.
Not open to students with credit for 630.
The economics of government spending and taxation; analysis of the fiscal role and instruments of government and their effects on the economy. Cameron, Gold, Lynn, and Stocker.

632 U G 4
Government Budgeting and Expenditure Criteria
W. 4 cl.
Prereq.: 501, 502, and 530; or grad. standing in Econ.
Analysis of various economic criteria for efficient decision making in the budgeting process; the various types of budgets and their relationship to efficient expenditure policy. Cameron, Gold, Tybout, and Stocker.

633 U G 4
State-Local Government Finance
Sp. 4 cl.
Prereq.: 501, 502, and 530; or grad. standing in Econ.
Economic analysis of revenues and expenditures of state and local governments; vertical and horizontal relationships between agencies and units; specific problems in these areas. Cameron, Gold, and Stocker.

640 (740) U G 4
Probability and Statistical Decision Theory
Su, W. 4 cl.
Prereq.: 400 or 402, and 442 or equiv.
Theory of probability and stochastic processes; statistical inference; tests of significance and analysis of variance; statistical decision theory. Cunningham, L'Esperance, Porter, and Swamy.

641 (741) U G 4
Applied Regression and Correlation Analysis
A, Sp. 4 cl.
Prereq.: 400 or 402, and 442 and permission of dept., contingent on student's facility with matrix methods. The general linear regression model; matrix algebra; multiple correlation, analysis of variance and tests of significance; specification errors. Cunningham, L'Esperance, Mattila, Porter, and Swamy.
644  
Mathematical Economics
A. 3 cl.
Prereq.: 502, 502, and Math. 221 or Math. 254 or equiv.
Mathematical analysis of linear economic theory; application of differential calculus, difference equations and mathematical programming to marginal analysis, economic dynamics, simulation models, and price theory. Dunnyngham and Loden.

645  (745)  
Linear Programming and Economic Analysis
W. 3 1½-hr. cl.
Prereq.: 501 and permission of dept., contingent on student's facility with matrix methods.
Techniques of linear programming and input-output analysis applied to economic problems of allocation and valuation within the firm and the economy. Bushnell and Tybout.

652  (667)  
Development Planning
W. 4 cl.
Prereq.: 502 and 550.
Analysis of the economics of planning and its major applications to private and public planning; procedures and techniques of development planning. Kelley, Michael, and Singh.

665  
International Trade and Finance
W. 5 cl.
Prereq.: 501 or 502; and 520.
Specialized production, comparative cost and advantages, and the gains from trade; international payments and receipts, possible equilibrium; balance-of-payments adjustments under different monetary systems; reforms. James, Stillison, and Wipf.

666  
International Commercial Policy
Sp. 3 cl.
Prereq.: 665.
Tariffs and other trade restrictions; economic effects of protective tariffs; regional economic integration; U. S. commercial policies; multilateral tariff reductions of America and Common Market. James, Stillison, and Wipf.

670  
Competition and Public Policy
W. 3 cl.
Prereq.: 501 and 570.
Nature, role, and regulation of competition; market structure and social performance; antitrust laws; current economic, legal, and policy problems in the antitrust area. Boyd, Lynn, and Raskind.

683  
Unions and Collective Bargaining
A. 3 cl.
Prereq.: 580 plus 1 other 500-level course in Econ.
Development of unionism in the United States; structure and government of contemporary labor organizations; collective bargaining; settlement of labor-management disputes. Barth, Miller, and Parnes.

684  
Labor and the Government
W. 5 cl.
Prereq.: 580 plus 1 other 500-level course in Econ.
Public policy with respect to labor problems and industrial relations; role of legislative, judicial, and executive branches of state and federal governments. Mattila, Miller, and Parnes.

692  
Urban Economics
Sp. 4 cl.
Prereq.: 501 and 530.
Application of economic theory to urban problems; topics include slums, residential segregation, income location of economic activity, urban renewal, urban sprawl, transportation, and governmental organization. Weicher.

693  (699)  
Individual Studies
Advanced readings in Econ. and related fields. Juniors registered for 693 must have an average of B or better in all Econ. courses; and a cumulative point-hour ratio of 3.0 or better. Repeatable to a maximum of 15 cr. hrs. in any combination of decimal subdivisions.

693.01 Economic Theory and History of Thought
693.02 Economic History
693.03 Money, Banking, and Monetary Policy
693.04 Government Finance and Expenditure
693.05 Quantitative Methods in Economics
693.06 Economic Development and Development Planning
693.07 International Economics
693.08 Structure and Regulation of Industry
693.09 Labor Economics
693.10 National Security Economics
693.11 Soviet Economy
693.12 Open Field

694  (798)  
Group Studies
Advanced courses in Econ. and related fields. Not more than 5 cr. hrs. may be received in any one decimal subdivision nor a total of more than 15 cr. hrs. in any combination of decimal subdivisions.

694.01 Economic Theory and History of Thought
694.02 Economic History
694.03 Money, Banking, and Monetary Policy
694.04 Government Finance and Expenditure
694.05 Quantitative Methods in Economics
694.06 Economic Development and Development Planning
694.07 International Economics
694.08 Structure and Regulation of Industry
694.09 Labor Economics
694.10 National Security Economics
694.11 Soviet Economy
694.12 Open Field

695  (770)  
Economics of National Security
A. 3 cl.
Not open to students with credit for 679.
Analysis of economics problems arising from defense and war; emphasis on implication of defense and war economy and on economic theory and institutions. Sherman.
Introduction to National Security
(See Nat. Sec. Pol. S. 702.)

742 U G 4
Econometrics
A. 4 cl.
Prereq.: 641 or equiv.
Review of the general linear model; identification; estimating criteria; single and simultaneous equation estimation; econometric application. Cunyngham, L'Esperance, Porter, and Swamy.

Research Principles and Techniques in National Security
(See Nat. Sec. Pol. S. 785.)

800 G 3
Research Methods in Economics
A. 1 1/2-cl. cl.
Required of all new grad. students in Econ. Methods of economic research, choice of research topics, and presentation and evaluation of results obtained. Brunner.

Seminar in National Security Research
(See Nat. Sec. Pol. S. 801.)

801 G 4
History of Economic Thought
W. 3 cl.
Economic writings from the earliest times to 1870. Bodenhorn and Lynn.

802 G 4
History of Economic Thought
Sp. 3 cl.
Prereq.: 801.
Orthodox and critical authors from 1870 to J. M. Keynes. Bodenhorn.

805 (708) G 5
Micro-economic Theory
Su, A, Sp. 4 cl.
Prereq.: Math. 151 or equiv. 
Nature of economic analysis; theory of demand, costs, and prices; factor price determination and functional income distribution; competition, oligopoly, monopoly, and monopsony. Bodenhorn, Boyd, Laden, Lindsey, and Stillson.

806 (709) G 4
Macro-economic Theory
A, W. 4 cl.
Prereq.: Math. 151 or equiv.
Theory of income and employment; Keynesian aggregate supply and demand; consumption, saving, and the multiplier; determinants of investment and the accelerator; government's role. Baltensperger, Dewald, Kepecky, Laden, and Lindsey.

808 (804 A) G 5
Advanced Micro-economic Theory
Sp.
Prereq.: 805, 806, Math. 221 or 254 or equiv. and permission of dept., contingent on student's facility with matrix methods. Bodenhorn.

809 (804 B) G 5
Advanced Macro-economic Theory
A.
Prereq.: 805, 806, Math. 221 or 254 or equiv. and permission of department, contingent on student's facility with matrix methods. Baltensperger, Bodenhorn, and Brunner.

820 G 3
Monetary Theory
W. 2 1/2-cl. cl.
Prereq.: 520, 805, and 806 or equiv.
Role of money in theoretical analysis of forces determining and influencing level of income, employment, and prices. Brunner and Dewald.

821 G 3
Bank Structure and Regulation
Sp. 3 cl.
Prereq.: 520, 805, and 806 or equiv.
Relation of bank regulation and supervision to composition of banking industry; impact of differing banking structures on economic growth and stability; proposals for structural changes. Baltensperger and Brunner.

831 G 3
Legal and Economic Problems in Taxation
Sp.
Legal, economic, and administrative problems in taxation. Lynn.

842 G 5
Quantitative Econometric Methods
W. 2 1/2-cl. cl.
Prereq.: 742.
Theory and application of advanced quantitative research methods; computerized application of econometric methods developed in 742. Cunyngham, L'Esperance, Porter, and Swamy.

843 (852) G 3
General Business Conditions Analysis
Prereq.: 20 cr. hrs. in Econ. and/or Bus. Org. and permission of instructor.
Not for grad. credit for majors in Econ.
Theoretical and applied analysis of general economic conditions and their relation to decisions of the firm. Bodenhorn, Brada, Bushnell, Hogan, Laden, and L'Esperance.

844 G 3
Managerial Economics
W, Sp. 2 1/2-cl. cl.
Prereq.: Bus. Admn. 801.02.
MBA core course in microeconomics; production and consumer theory, market forms, welfare, distribution, general equilibrium, and capital theory. Bushnell and Hogan.

850 G 4
Advanced Economic Development
W. 1 cl.
Not open to students with 6 cr. hrs. for 810.
861 G 4
Advanced International Economics
A. 4 cl.
Prereq.: 666, 805 and 806 recommended.
Advanced international trade theory; the analysis of the effect of trade on the allocation of resources, income distribution, and growth; analysis of balance of payments adjustments. James, Stillson, and Wipf.

872 G 4
Industrial Organization
W. 4 cl.
Prereq.: 670 and 805.

884 G 4
Advanced Economics of the Labor Market
Sp. 4 cl.
Prereq.: 805 and 806.
Economic theory and empirical evidence relating to labor allocation and wage determination. Barth, Fleisher, and Parnes.

889 G 1-5
Interdepartmental Seminars
(See under Interdepartmental Seminars.)

911 (811) G 4
Seminar in Economic History, American and European
Sp.
Prereq.: 613 and 614 or equiv. or permission of instructor.
Repeatable to a maximum of 8 cr. hrs.
Selected research topics in economic history.

915 G 4
Seminar in Price Theory
W. 2 cl.
Prereq.: 808 and 809.
Repeatable to a maximum of 8 cr. hrs.
Special topics in economic theory.

918 G 4
Seminar in Economic Problems of the Soviet Union and Eastern Europe
A. 3 cl.
Prereq.: 607 and 608.
Repeatable to a maximum of 8 cr. hrs.
Selected research topics. Brada and Eason.

930 (830) G 4
Seminar in Government Finance
W. 1 cl.
Prereq.: 631 and 632.
Repeatable to a maximum of 8 cr. hrs.
Analysis of theoretical and applied aspects of fiscal economics in the American and foreign economies; selected topics of current and permanent importance. Gold and Stocker.

940 (848) G 4
Seminar in Econometrics
Sp. 1 cl.
Prereq.: 742 and 842 or equiv. or permission of instructor.
Repeatable to a maximum of 8 cr. hrs.
Examination of economic problems whose solutions may advantageously be sought by use of the methods of mathematics and mathematical statistics. Cunyngham, L'Esperance, Porter, and Swamy.

950 (891) G 4
Seminar in Economic Development and Planning
Sp. 1 cl.
Prereq.: 652 and 850, or permission of instructor.
Repeatable to a maximum of 8 cr. hrs.
Selected topics in the process of economic development and in planning for development; analysis and evaluation of planning methodologies, strategies, and systems. Kelley, Michael, and Singh.

960 (850) G 4
Seminar in International Economic Problems
A. 3 cl.
Prereq.: 861.
Repeatable to a maximum of 8 cr. hrs.
Seminar in analytical problems, theoretical and applied, of international economic adjustments; development of techniques for implementation of policies. James, Stillson, and Wipf.

970* (870) G 4
Seminar in Structure and Regulation of Industry
W. 1 cl.
Prereq.: 670.
Repeatable to a maximum of 8 cr. hrs.

980 (880) G 4
Seminar in Industrial Relations
W. 2 cl.
Prereq.: 683 or equiv. or permission of instructor.
Repeatable to a maximum of 8 cr. hrs.
Selected topics and issues in contemporary trade unionism and collective bargaining. Barth, Miller, and Parnes.

981 (881) G 4
Seminar in the Economics of the Labor Market
Sp. 1 cl.
Prereq.: 882.
Repeatable to a maximum of 8 cr. hrs.
Selected topics and issues in wage determination, employment and unemployment. Kelley, Miller, and Parnes.
Education

Office: 127 Arps Hall, 145 North High Street

ACADEMIC FACULTIES OF THE COLLEGE OF EDUCATION

THE ARTS IN EDUCATION

Professors Barkan, McBride, Severino and Tolbert; Associate Professors Cady, Chapman, Elland, Orr, Ramsey, Rast, and Sexton; Assistant Professors Bonney, Costanza, Culver, Duncan, Kern, McWhinney, Meek, Norris, Simmons, and Zernich.


CURRICULUM AND FOUNDATIONS

Office: 103 University School, 29 West Woodruff Avenue

Professors Frymier (Chairman), Alberly, Andrews, Arisman, Bourgeois, Coon, Cotterill, Dale, Duncan, Hough, Kircher, Kloss, Mathis, Smith, and Enock;

Associate Professors Galloway, Reagan, and Williams.


EARLY AND MIDDLE CHILDHOOD EDUCATION

Office: 210 Arps Hall, 145 North High Street.

Professors Cruickshank (Chairman), Burr, Emans, Frazier, Harding, Huk, King, Loomis, and Trolminson; Associate Professors Bozeman, Languis, Miller, Orr, Schatz, Stull, Tewksbury, and Utterback; Assistant Professors Cunningham, Kerber, Kloe, Leder, Rentsch, and Rolfe.

Child Development and Guidance: 460, 815, 821.

Children's Literature: 467, 617.

Early Childhood Education: 501, 824, 925.10, 994.10.


Mathematics: 582, 812.

Language Arts: 507, 813.


Since the EMCE Faculty plays an extensive role in reading, see the catalog section on Reading. The Reading Center is located in University School.

Science: 511, 811, 920.

The Elementary Science-Math Center is located in University Schools, Rooms 313-315.

Social Studies: 308, 814.

EDUCATIONAL ADMINISTRATION

Office: 307 University School, 29 West Woodruff Avenue

Professors Larmee (Chairman), Conrad, Cunningham, Hack, Herrick, Laughlin, Staub, and Wolbers; Associate Professors Anderson, Candoli, and Nystrom; Assistant Professors Sandford and Wagstaff.

EDUCATIONAL DEVELOPMENT
Office: 215 University School, 29 West Woodruff Avenue
Professors Sanders (Chairman), Blanke, Cook, Mooney, Roaden, and Severing; Associate Professors Bargar, Buchhawan, Ebsell, Giatti, Hammond, Kovak, Stufflebeam, and Trzebiatowski; Assistant Professors D’Costa (Adjunct), Gunnel, Kennedy, Merriman, (Adjunct), and Shea (Adjunct).
Eduction: 294.48, 294.50, 594.48, 594.50, 675 678, 679, 693.48, 694.48, 694.50, 725, 785, 786, 787, 788, 925.48, 925.50, 964, 965, 966, 967, 968, 969 994.48, 994.50, 999.48.

EXCEPTIONAL CHILDREN
Office: 371 Arps Hall, 1945 North High Street
Professors Johnson (Chairman), Cassidy, Huelsman, and Smith; Associate Professors Brittin, Hunt, and Lema; Assistant Professors Berensof, Cavin, Lavelly, and Okada.
Behavior Disorders: Education 718 and Psychiology 682.
Blind and Partially Seeing: Education 586.52, 666, 667, 668, 669, 717, 719, 855.52.
Child Study: Psychology 854, 855.01, 855.02, 855.03, 853.04, 855.05, 856.
Educational Disability: Psychology 651, 681, 683, 701.
Mental Retardation: Education 588.54, 652, 653, 654, 655, 656, 657, 885.54, and Psychology 857.
Physically Handicapped: Education 588.47, 715, and Psychology 858.
Speech and Hearing Therapy: Education 289.04, 588.04, 662, 663.

HUMANITIES EDUCATION
Office: 227 Arps Hall, 1945 North High Street.
Professors Jewett (Chairman), Allen, Eberhart, Lewis, Muesgig, Otto, Frissleur, and Zidonitis; Associate Professors Bateman, Gilliom, Schoen, Stewart, and Woodruff.
Social Studies Education: 294.28, 526, 587.28, 594.28, 692.28, 693.28, 724.28, 725.28, 994.28, 999.28.
Speech Education: 289.09, 294.09, 442, 566 587.09, 588.09, 594.09, 631, 693.09, 694.09, 925.09, 994.09, 999.09.

INDUSTRIAL TECHNOLOGY
Office: Oxley Hall, 1712 Nile Avenue
Professors Lux (Chairman) and Ray; Associate Professor Butler; Assistant Professors Hauenstein (Adjunct), Hoffman, and Jenkins.
Education: 120, 220, 221, 222, 224, 225, 227, 228, 231, 232, 235, 236, 243, 251.21, 255, 251.25, 255, 395, 353, 352, 353, 354, 587.21, 594.21, 610, 692.21, 693.21, 694.21, 832, 833, 834, 835, 856, 877, 925.21, 994.21, 999.21.

SCIENCE AND MATHEMATICS EDUCATION
Office: 246 Arps Hall, 1945 North High Street
Associate Professor Howe (Chairman); Professors Coon, Schnelling, and Trimble; Associate Professors Crosswhite, and Mayer; Assistant Professors Holgeon, Osborne, Shumway, and White.
Science Education: 294.27, 551, 587.27, 594.27, 625, 626, 627, 693.27, 694.27, 849, 850, 851, 925.27, 994.27, 999.27.

SPECIAL SERVICES
Office: 367 Arps Hall, 1945 North High Street
Associate Professor Dowling (Chairman); Professors Kemp, MacMinn, McBride, Peters, Reynard, Riccio, and Tripp; Associate Professors Quananta; Assistant Professors Ohliger, Silverman, and Wiggil.
Adult Education: 672, 673, 692.35, 693.35, 925.33, 931, 932, 933, 934, 994.33, 999.33.
Guidance: 692.34, 693.34, 694.34, 694, 785, 786, 877, 878, 879, 880, 925.34, 954, 973, 974, 975, 976, 977, 978, 994.34, 999.34.
Student Personnel Work: 693.32, 694.32, 925.32, 938, 943, 994.32, 999.32.

VOCATIONAL-TECHNICAL EDUCATION
Office: 122 Townshend Hall, 1885 Neil Avenue
Professors Reese (Chairman), Cotrell, Hanra, Jennings, Taylor, and Wells; Associate Professors Arldorf, Ferguson, Morrison, and Vivian; Assistant Professor Miller.
Distributive Education: 294.29, 529, 587.29, 924.29, 605, 606, 608, 692.29, 693.29, 694.29, 925.29, 994.29, 999.29.

108 (408) U 3
Introduction to the Study of Education
Su, A, W, Sp. 3 cr.
An introductory study of cultural factors that affect education, with students helped to understand through an examination of their own lives.

120 (440) U 4
Industrial Practices and the School
A, W, Sp. 5 2-hr. cl. and lab.
A study of the history and role of industrial technology, and its relation to the school through experiences in planning, organizing, and controlling a managed production system. Fee.
220 (460) U 3
Design of Constructed and Manufactured Goods
A, Sp. 2 2-hr. cl. and lab.
Prereq.: Engr. Gr. 100, or 102.
Not open to students with credit for 212.
A study of historical and contemporary design technology as it is applied in the construction and manufacturing industries.

221 (443) U 4
Manufacturing Practices I
A, Sp. 5 2-hr. cl. and lab.
Prereq.: 120, 220, and Engr. Gr. 100.
Not open to students with credit for 233.
A study of basic concepts of manufacturing technology through experiences in forming, separating, combining, and assembling materials used in the production of manufactured goods. Fee.

222 (444) U 4
Manufacturing Practices II
W, Sp. 5 2-hr. cl. and lab.
Prereq.: 223.
Not open to students with credit for 234.
A study of manufacturing management technology, manufacturing production technology, and manufacturing personnel technology through experiences in planning, engineering, and production of selected manufactured goods. Fee.

224 (450) U 4
Mechanical Systems and Servicing
A, Sp. 5 2-hr. cl. and lab.
Prereq.: 120; Math. 150 or equiv.; and Physics 101 and 102, or equiv.
Not open to students with credit for 424.
A study of the fundamental knowledge of techniques necessary for the application of mechanical power systems to industrial activities and the practices of servicing mechanical power systems. Fee.

225 (451) U 4
Transmitting and Utilizing Mechanical Power
Su, W. 5 2-hr. cl. and lab.
Prereq.: 224.
Not open to students with credit for 425.
A study of the selection, installation, operation, and maintenance of mechanical power transmission systems for industrial and transportation activity. Fee.

227 (446) U 4
Electrical Systems and Servicing
A, Sp. 5 2-hr. cl. and lab.
Prereq.: 120; Math. 150 or equiv.; Physics 101 and 102, or equiv.
Not open to students with credit for 420.
A study of the fundamental knowledge of techniques necessary for the application of electricity to industrial activities and the practices utilized in fabricating and servicing of electrical systems. Fee.

228 (450) U 4
Electronic Systems and Servicing
W. 5 2-hr. cl. and lab.
Prereq.: 227.
Not open to students with credit for 430.
A study of the fundamental knowledge of techniques necessary for the application of electronics to industrial activities and the practices utilized in fabricating and servicing electronic systems. Fee.

231 (441) U 4
Construction Practices I
A, W, Sp. 5 2-hr. cl. and lab.
Prereq.: 221.
A study of basic concepts of construction technology through experiences in forming, separating, and combining materials used in the production of constructed goods.

232 (442) U 4
Construction Practices II
A, W. 5 2-hr. cl. and lab.
Prereq.: 231.
A study of construction management, production, and personnel technologies through real and simulated experiences in the production of constructed goods.

235 (444) U 4
Graphic Reproduction Practices
Su, A, Sp. 5 2-hr. cl. and lab.
Prereq.: 120, 220, and Engr. Gr. 100.
An examination of graphic reproduction processes, manipulative skills necessary to teach graphic reproduction processes, and administrative procedures required to operate a graphic arts program.

236 (560) U 4
Printing and Publishing Practices
W. 5 2-hr. cl. and lab.
Prereq.: 220, and Photog. and Cinma. 201.
Not open to students with credit for 246.
An examination of the managed production system utilized in the printing and publishing industry.

243 (522) U 5
Elementary School Industrial Arts Activities
Su, A, W, Sp. 5 2-hr. cl. and lab.
Prereq.: 461 or equiv. Major standing in Elementary or Special Ed.
Laboratory experiences involving the use of tools, materials, processes, and products through which society supplies its need for food, clothing, shelter, tools, machines, records, utensils, and transportation. Fee.

251 (581) U 3-6
Work Experience in Industry
Prereq.: Major standing in the area chosen, and permission of instructor.
Repeatable to a maximum of 18 cr. hrs.
251.21 Industrial Arts Education
A firsthand study of working conditions, methods, and processes of industry, and their implication for the teaching of industrial arts.
251.22 Vocational Trade and Industrial Education
Occupational competency credit in subject matter field established by comprehensive examination.
The Handicrafts
A, W, Sp. 5 2-hr. cl. and lab.
Open only to Occupational Therapy, Physical Education, and Public Recreation majors.
Repeatable to a maximum of 12 cr. hrs.
Designed to develop skills and knowledge in the use of the common areas of handicrafts such as leather, metals, plastics, wood, and the graphic arts. Fee.

Typewriting I
A. 4 1-hr. lab.
Not open to students with credit for 206.
Required in the 2nd yr. of students majoring in business education who lack proficiency required for admission to 206.
(Placement tests for students having had previous training in typewriting will be given during the first class meeting of 260 and 261; students reporting for placement tests need not be registered in this course.)
Development of skill in the operation of the typewriter, in producing copy, and in concomitant learning; the place of typewriting in business.

Typewriting II
W. 4 1-hr. lab.
Prereq.: 260.
Not open to students with credit for 207.
Continuation of 260.

Typewriting III
Sp. 4 1-hr. lab.
Prereq.: 261.
Continuation of 261.

Shorthand I
A. 4 1-hr. lab.
Not open to students with credit for 208.
Required in the 2nd yr. of students majoring in business education who lack proficiency required for admission to 206.
(Placement tests for students having had previous training in shorthand will be given during first class meeting of 263 and 264; students reporting for placement tests need not be registered in this course.)
The theory of Gregg shorthand, development of good shorthand permanency, the ability to take dictation at increasing rates of speed, and the ability to transcribe longhand using correct punctuation and spelling.

Shorthand II
W. 4 1-hr. lab.
Not open to students with credit for 209.
Prereq.: 263, or equiv.
Continuation of 263.

Shorthand III
Sp. 4 1-hr. lab.
Prereq.: 264.
Continuation of 264.

Advanced Stenography I
A. 4 2-hr. lab.
Prereq.: 262 and 265, or equiv.
Not open to students with credit for 210.
(For placement tests in typewriting and shorthand, see 250 and 263).
Continued development of speed and accuracy in shorthand and typewriting; development of skill in transcription; transcribing voice-recorded dictation; duplicating.

Advanced Stenography II
W. 4 2-hr. lab.
Prereq.: 265.
Not open to students with credit for 211.
Continuation of 265.

Advanced Stenography III
Sp. 4 2-hr. lab.
Prereq.: 266.
Not open to students with credit for 212.
Continuation of 266.

Field Service Experiences
(Supervision by both college and agency staff, weekly seminar, and evaluation paper.)
Professional service with children or youth in some school or community agency.

Interpretation of September Field Experience in Schools
Limited to students who have completed 30 full school days of service in schools in the immediately preceding September.

Experience in Community Agencies
For students in all curricula in teacher education (elementary, secondary, and special subject areas) except those students registering for the special section as listed below.

Art Education
For students in the curriculum in Art Education.

Speech and Hearing Therapy
For students in the Speech and Hearing Therapy Curriculum.

Able Student Program
For students in the Able Student Program.

Public Recreation
For students in the curriculum in Public Recreation.
289.07    Physical Education (Men)  U  2-5
For students in the curriculum in Physical Education for Men.

289.08    Physical Education (Women)  U  2-5
For students in the curriculum in Physical Education for Women.

289.09    Speech and Radio-Speech  U  2-5
For students in the curricula in Speech and Radio-Speech.

289.13    Experience in Urban Schools  U  5
For students in all curricula in teacher education.

294    U  3 or 5
Special Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Group studies for students in specialized programs.

294.03    Speech Education
294.10    Elementary Education
294.13    Experience in Urban Schools
294.21    Industrial Arts Education
294.22    Trade and Industrial Education
294.23    Business Education
294.25    Teaching of English
294.26    Teaching of Mathematics
294.27    Teaching of Science
294.28    Teaching of Social Studies
294.29    Distributive Education
294.30    Vocational-Technical Education
294.40    History of Education and Comparative Education
294.41    Philosophy of Education
294.43    Radio and Television Education
294.45    Teaching of Foreign Languages
294.46    Audio-Visual Materials of Instruction
294.48    Educational Development
294.49    Curriculum and Instruction
294.50    Educational Change
294.56    Reading

H299    U  3 or 5
Education Honors Colloquium
Prereq.: Participation in the College of Education Honors Program, or permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Discussion of the rationale of specific fields of educational inquiry; topics vary quarterly.

355    U  4
Custom Production of Industrial Goods
W, Sp.  5 2-hr. cl. and lab.
Prereq.: 231.
Not open to students with credit for 255.
A study of custom production planning and custom production processing of industrial goods through experiences in the custom production of selected manufactured goods. Fee.

433    (547)    U  3
The Teaching of Driver Education
Su, A, W, Sp.  1 2-hr. cl., 1 2-hr. lab.
Prereq.: 435, 4th yr. standing, and valid driver's license.
Graduates of the College of Education who have completed this course will be eligible for certification to teach driver training courses in the secondary schools of Ohio. Designed to prepare teachers to organize and conduct driver training classes in the secondary schools, including methods of teaching, scheduling, and other pertinent details. Fee.

435    (535)    U  5
Theory and Practice in Secondary Education
Su, A, W, Sp.  4 2-hr. cl.
A laboratory field experience course introducing topics, problems, and skills common to prospective secondary school teachers.

442    U  3
Creative Dramatics
Su, A, W, Sp.  3 cl. and lab.
Prereq.: Psychol. 230, or equiv.
Philosophy, materials, methods, and evaluation of dramatic improvisation in developing creative artistic expression and problem solving.

460    (515)    U  4
Elementary Education: Child Guidance
Su, A, W, Sp.  4 cl., 1 lab.
Prereq.: Psychol. 230; concur. 461.
Not open in Su. to elementary majors who lack teaching experience.
Lab. time is spent in observation-participation in an elementary school classroom.
To develop an understanding of child growth and development principles in relation to instruction.

461    (514)    U  3
Elementary Education: Conceptions of Teaching
Su, A, W, Sp.  2 1/2-hr. cl.
Prereq. or concur.: 460.
Not open in Su. to elementary education majors who lack teaching experience.
The lab. for 460 also serves 461. (Students who enroll only in 461 because of previous credit for 460 will be assigned to an elementary classroom for observation and participation at the same time as the 460 lab.) Designed to acquaint students with certain aspects of elementary school programs which cut across separate subject areas, and to acquaint students with certain teaching behaviors.

467    (521)    U  3
Introduction to Children's Literature
Su, A, W, Sp.  3 cl.
Prereq. or concur.: 461.
Study of literature for children with emphasis on standards for selecting materials with reference to the interests, needs, and abilities at different age levels. Fee.
501 (509) U 3
Kindergarten and Pre-School Teaching
Su, A, W, Sp. 2 1½-hr. cl.
Prereq.: 450, or permission of instructor.
Recent development in the education of young children
and its influence on the selection and guidance of
appropriate activities.

502 (510) U 3
Elementary Education: Arithmetic
Prereq.: 461, and Math. 105.
A study of the methods and materials used in
arithmetic instruction; includes development of
functional relationships with other curriculum areas,
diagnostic procedures, and remedial work.

507 U 3
Elementary Education: The Language Arts
Su, A, W, Sp. 2 2-hr. cl.
Prereq.: 461.
Consideration given to the teaching of language arts,
including listening, oral, and written communications.

508 (517) U 4
Elementary Education: The Social Studies
Su, A, W, Sp. 2 2-hr. cl. and 1 lab.
Prereq.: 461; concurs. 513 should be scheduled on the
same day of the week and at consecutive A.M. or P.M.
hours just prior to student teaching.
Not open in Su. to elementary majors who lack
teaching experience.
Lab time is spent in participation in an elementary
school.
Students may not schedule more than 20 cr. hrs.
while taking this course.
Sequential arrangement of the elementary education
curriculum. Particular emphasis is placed on social
studies in the elementary school program.

511 (528) U 4
Elementary Education: Science
Su, A, W, Sp. 2 2-hr. cl., and 2 lab. hrs. arr.
Prereq.: 461, and 15 cr. hrs. of science. (The University
Basic Education Requirement in science may be used.)
Consideration is given to the role of science in
childhood education and to the study of content,
methods, materials, and equipment appropriate for
this program. Fee.

513 U 4
Elementary Education: Reading
Su, A, W, Sp. 2 2-hr. cl., and 1 lab.
Prereq.: 461; concurs. 508 should be scheduled on the
same day of the week and at consecutive A.M. or P.M.
hours just prior to student teaching.
Not open in Su. to elementary majors who lack
teaching experience.
Lab time is spent in participation in an elementary
school.
Students may not schedule more than 20 cr. hrs.
while taking this course.
A study of various methods and materials used in
the teaching of reading in the elementary school today.
Fee.

520 U 2
Teaching Typewriting and Office Practice
A. 2 cl.
Prereq.: 262 or equiv., 435, and 4th yr. standing.
Objectives, methods, classroom procedures, and
materials for teaching typewriting and clerical
practice.

521 U 2
Teaching Shorthand and Transcription
A. 2 cl.
Prereq.: 265 or equiv., 435, and 4th yr. standing.
Objectives, methods, classroom procedures, materials,
and evaluation for teaching shorthand, transcription,
and business English.

523 (543) U 3
Teaching Bookkeeping and Office Machines
A. 3 cl.
Prereq.: Acc. 221 and senior standing.
The objectives, methods, classroom procedures, and
materials for teaching bookkeeping and accounting,
office machines, and business arithmetic.

524 (544) U 3
Methods of Teaching Basic Business Subjects
W. 3 cl.
Prereq.: 435, 4th yr. standing, and 25 cr. hrs. in Geog.,
Econ., and Bus. Org.
Objectives, methods, classroom procedures, and
materials for teaching general business, business law,
consumer economics, and business organization in
the high school.

526 (677) U 4
Teaching of Social Studies
Su, A, W, Sp. 2 2-hr. cl.
Prereq.: 435, and Hist. 104 or 123.
Illustrative material will be drawn primarily from
history with some attention to other social studies;
consideration of teaching methodology and recent
trends in social studies education.

529 (780) U 3
Methods of Teaching Distributive Education
Su, W. 3 cl.
Prereq.: 435.
The organization and preparation of teaching plans for
distributive education classes; analysis of current
on-the-job training methods in business establishments.

532 (561) U 3
The Teaching of Industrial Arts I
A. 1 ½-hr. cl.
Prereq.: 435, and 3rd yr. standing.
A critical study of objectives, methods of presentation,
evaluation class and laboratory procedures, and
professional problems.

533 (562) U 3
The Teaching of Industrial Arts II
W. 1 ½-hr. cl.
Prereq.: 532 and 3rd yr. standing.
Examinations and evaluation textbooks, industrial
publications, and audio-visual materials suitable for the
various grade levels; research and development; and
special consideration for exceptional pupils.
543 (563) U 3
The Teaching of Industrial Arts III
Sp. 1 1/2-hr. cl.
Prereq.: 439, and 4th yr. standing.
Problem design and presentation; planning secondary school courses in drawing and the graphic arts; methods of student evaluation; and correlation with other subject fields; industrial practice.

540 (588) U 4
The Teaching of Modern Foreign Language I
2 2-hr. cl.
Prereq. or concours: 435, and permission of instructor.
Study of the preparation and use of new instructional materials for beginning foreign language classes; the teaching of audio-lingual skills; evaluation and testing.
  a. A, Sp. French
  b. Su, A, Sp. Spanish
  c. German

546 (659) U 4
Teaching Mathematics in Secondary Schools I
A, W, Sp. 4 cl.
Prereq.: 435, and 20 cr. hrs. in Math.
Mathematical concepts, objectives, and classroom procedures appropriate for secondary schools; selection, preperation, and use of teaching materials including lesson plans, study guides, textbooks and multisensory aids.

551 (694) U 4
Science in Secondary Schools
Su, A, W, Sp. 4 cl.
Prereq.: 435, Psychol. 230, and a major or minor in Phys., Biol., or Earth Science; admission to professional standing.
Objectives, problems and procedures, preparing teaching plans, use of demonstrations, experiments, and projects, science curriculum and evaluation, instruments and procedures, texts and reference materials. Fee.

556 (627) U 4
The Teaching of Speech in Secondary Schools
Su, A, Sp. 4 cl.
Prereq.: 435 and Speech 205, 280, 305.
The relationship of speech to the total school program with special emphasis on fundamental processes and forensic activities.

560 (670) U 4
Teaching Literature in Secondary Schools
Su, A, W, Sp. 4 cl.
Prereq.: 561. (Both 560 and 561 are prereq. to 587.25.)
The objectives of the literature program and techniques for developing appreciation and improving skills in the reading of various types of prose and poetry.

561 (671) U 4
Teaching Grammar and Composition in Secondary Schools
Su, A, W, Sp. 4 cl.
Prereq.: 435, and at least 10 cr. hrs. in Engl. courses numbered 200 or higher. (Both 560 and 561 are prereq. to 587.25.)
The role of grammar and linguistics in the English program and techniques for the teaching of oral and written expression in high school.

575 (518) U 3-6
Vocational Trade Industrial and Technical Teaching
Prereq.: Temporary vocational teaching certificate in a trade or industrial subject, or eligibility for such certificate, and permission of instructor. Repeatable to a maximum of 18 cr. hrs.
Provides teaching methods, techniques, and vocational course organization.

585 (520) U 3-7
Elementary School Student Teaching in Special Fields
Prereq.: Ed. 3rd yr. standing.
Fee.

585.10 Standard Elementary Student Teaching
U 9, 12, or 15
For students in the regular elementary education degree program. All students must enroll for 15 hours unless they have transfer credit for part of this requirement.

585.11 In-Service Student Teaching
U 6, or 9
For approved students with 3 or more years of successful teaching experience.

585.12 Post Degree Elementary Student Teaching
U 12-15
For students in the program for graduates with Bachelor of Arts or comparable degrees.

586 (529) U 3-7
Elementary School Student Teaching in Special Fields
Prereq.: Ed. 3rd yr. standing.
Fee.

586.03 Art Education
U 3-15
Physical Education (Men)
586.08 Physical Education (Women)
586.14 Instrumental Music
586.15 Vocal Music
586.49 Foreign Languages

587 (536) Student Teaching in Secondary Schools
Prereq.: Ed. 4th yr. standing.
A minimum of 12 cr. hrs. is required.
For additional information, see College of Education catalog.
Observation, participation, and responsible teaching in a public school in the greater Columbus area; individual and group conferences or seminars.
Students desiring teaching in more than one area should indicate accurately both section numbers and hours in each. Fee.

587.03 Art Education
U 3-15
587.07 Physical Education (Men)
U 3-15
587.08 Physical Education (Women)
U 3-15
587.09 Speech Education
U 3-15
587.14 Instrumental Music U 3-8
587.15 Vocal Music U 3-8
587.21 Industrial Arts U 3-15
587.22 Trade and Industrial Education U 3-15
587.23 Business Education U 3-15
587.24 Health Education U 3-15
587.25 English U 3-15
587.26 Mathematics U 3-15
587.27 Science U 3-15
587.28 Social Studies U 3-15
587.29 Distributive Education U 3-15
587.45 Foreign Languages U 3-15
   a. French
   b. Spanish
   c. German
   d. Russian
   e. Latin
587.52 Dance Education U 3-15

588 (537) U 3-15
Student Teaching in Special Fields
Prereq.: Ed. 4th yr. standing. A minimum of 12 cr. hrs. in student teaching is required.
For additional information, see College of Education catalog. Fee.
588.04 Speech and Hearing Therapy
588.09 Radio-Speech Education
588.47 Physically Handicapped
588.51 Dental Hygiene Education
588.52 Blind and Partially Seeing
588.54 Mental Retardation

594 U 3 or 5
Group Studies
Prereq.: Permission of instructor Repeatable to a maximum of 15 cr. hrs. Group studies for students in specialized programs.
594.08 Speech Education
594.10 Elementary Education
594.13 Experience in Urban Schools
594.21 Industrial Arts Education
594.22 Trade and Industrial Education
594.23 Business Education
594.25 Teaching of English
594.26 Teaching of Mathematics
594.27 Teaching of Science
594.28 Teaching of Social Studies
594.29 Distributive Education
594.30 Vocational-Technical Education
594.40 History of Education and Comparative Education
594.41 Philosophy of Education
594.43 Radio and Television Education
594.45 Teaching of Foreign Languages
594.46 Audio-Visual Materials of Instruction
594.48 Educational Development
594.49 Curriculum and Instruction
594.50 Educational Change
594.56 Reading

H599 U 3 or 5
Honors Course
Prereq.: 3rd yr. standing, enrollment in the College Honors Programs, and permission of adviser. Repeatable to a maximum of 15 cr. hrs. A program of independent study to allow full scope to the initiative of the student with special aptitudes.

601 U G 2
Business and Office Education Programs
Su, A, 2 cr.
Prereq.: 520, or 521, or 523, or equiv. Organization, implementation, evaluation, and improvement of vocational office education programs on the secondary school level; required of all business education majors. Wells.

602 U G 3
Cooperative Office Education
Su. 3 cr.
Prereq.: 520, or 521, or 523, or equiv. A study of new approaches to organization, operation, and supervision of the Cooperative Office Education Program and the understanding and evaluation of the recent thrust in vocational education and work-study programs. Jennings.

605 (781) U G 3
Curriculum Content for Distributive Occupational Subjects
Sp. 3 cr.
Prereq.: 529. Securing, evaluating, and organizing instructional material and experiences for distributive cooperative education and adult extension courses. Vivian.

606 (782) U G 3
Operation of Distributive Education Programs
Su, W. 1 1/2-hr. cr.

608 U G 2-5
Practicum in Distributive Education
Su, A, W, Sp. May be repeated once. Student is not permitted to enroll for any other courses during the qtr. Work in a retail, wholesale, or service organization previously approved by the student's adviser to be taken by undergraduate students after the sixth quarter of work; graduate students will be placed in a high school or post-secondary institution previously approved by the student's adviser. Vivian.

610 (641) U G 3
History of Practical Arts and Vocational Education
Su, W. 3 cr.
Prereq.: Ed. or Agr., 3rd yr. standing. History of those vocational and non-vocational phases of agriculture, business, industry, and homemaking which concern education. Lux.
612 (663) U G 3
Linguistic Materials for High School Teachers
A, W, Sp. 1 2/3-hr. cl.
Prereq.: 561.
A study of traditional and modern linguistic systems of grammar and their bearing on the work of the English teacher. Bateman.

613 (669) U G 3
Literature for Adolescents
Su, A, W, Sp. 2 1/2-hr. cl.
Prereq.: 560.
Fiction and nonfiction suitable for collateral reading of pupils in junior and senior high school; experience in book-reviewing, story-telling, oral interpretation, and discussion. Gallagher and Staff.

614 (674) U G 3
The Supervision of Journalism in Secondary Schools
Su, W. 1 cl.
Prereq.: 435 or equiv., and Jour. 204.
For journalism teachers in secondary schools and advisers; covers editorial, advertising, circulation, mechanical production, and publishing phases of school newspapers, magazines, and annuals.

616 (692) U G 4
The Teaching of Modern Foreign Language II
4 cl.
Prereq.: 435 and French 105 and 421, Spanish 105 and 421, or German 203 and 13 additional cr. hrs. in Ger., or Rus. 408, and permission of instructor.
Study of the use of new instructional materials for intermediate and advanced foreign language classes; teaching of reading, writing, literature; evaluation and testing.
  a. Su, A, W. French
  b. A, W. Spanish
  c. W. German
  d. W. Russian

617 (603) U G 4
The Teaching of Foreign Languages in the Elementary School
A, W.
Prereq.: 15 cr. hrs. of Ed., and at least one 500-level course in a foreign language.
Skill development in teaching of spoken and written foreign languages on the elementary school level; construction and use of suitable materials. Otto.

618 (694) U G 4
The Teaching of Latin
A. 3 cl., lab. arr.
Prereq. or concur.: 495, Latin 201, 202, and an additional 5 cr. hrs. in Latin.
Content of this course includes: values, teachers' equipment, objectives, and methods; classroom procedures; lectures, and assigned readings. Cleary.

621 (660) U G 4
Teaching Mathematics in Secondary Schools II
Su, A, W, Sp. 4 cl.
Prereq.: 546, and 25 cr. hrs. in Math.
Selected problems in curriculum; evaluation, materials of instruction, and the teaching of specific topics in arithmetic, algebra, and geometry.

622 (689) U G 3
Laboratory Methods and Materials in School Mathematics
Su. 1 2/3-hr. cl.
Prereq.: 621 or equiv., and a major or minor in Math.
The laboratory teaching of mathematics: experience in the preparation and use of teaching materials.

624 U G 3
Social Education
Su, A, W, Sp. 1 2/3-hr. cl.
Prereq.: 3rd yr. standing and 435 or 461 or permission of instructor.
Analyses of social structures and processes in classroom grouping arrangements; teacher social roles, school traditions, ceremonies, clubs, and athletics. Jewett.

625 (605) U G 3
Practicum in Biological Science for Teachers
Su, A, W. 3 2-hr. cl.
Prereq.: 551, 30 cr. hrs. in Biol. Sc., and 15 cr. hrs. in Chem.
Use and design of apparatus, demonstrations, and experiments; collection and preservation of biological materials; the role of the living organism in the classroom. Fee.

626 (606) U G 3
Practicum in the Earth Sciences for Teachers
Su, Sp. 3 2-hr. labs.
Prereq.: 551 and 30 cr. hrs. in Earth Science courses.
Use of the laboratory and field environment in teaching earth science; materials, demonstrations, and experimental methods.

627 (681) U G 3
Practicum in General and Physical Science for Teachers
Su, A, Sp. 3 2-hr. cl.
Prereq.: 551, and 30 cr. hrs. in major of General or Physical Science.
Use and design of apparatus, demonstrations, and experiments for general science, chemistry, and physics, with special emphasis on modern secondary school instructional materials in the sciences. Fee.

631 (628) U G 4
Teaching Dramatics and Oral Interpretation in Secondary Schools
Su, W. 4 cl.
Prereq.: 435, and Speech 205, 221, 270.
The organization and conduct of dramatic classes and extra dramatic activities; resource planning for oral readings, choral speaking, radio-television programming, and theatrical productions. Lewis.

632 U G 4
The History of Western Education
Su, A, W, Sp. 4 cl.
Development of educational systems in the Western world since ancient times, education in relation to other social institutions; continuity of its evolution.
636  U G 3
Historical Foundations of American Education
A, W, Sp.  1 2 1/2-hr. cl.
Development of education in the United States since colonial times; major emphasis on American education since 1830, including twentieth century developments. Mehl.

637  (607)  U G 3
Philosophy of Education
Su, A, W, Sp.  3 cl.
Prereq.: 4th yr. standing.
A study of various philosophies of education and their influences on methods, choice of subject matter, and the administration of the public school.

638  U G 4
The History of Negro Education in America
A, W, Sp.  4 cl.
The historical development of institutions educating the American Negro, and black and white views concerning the purposes of education from colonial times to the present. Simmons.

649  (695)  U G 3
Vocational Trade, Industrial and Technical Education for Out-of-School Youth and Adults
A.  1 2 1/2-hr. cl.
Prereq.: 575 or equiv., and permission of instructor.
Teaching or supervising experience required for graduate credit.
Study of causal factors, evaluation, learning potential, and general characteristics of the retarded child. Lively and Lema.

652  (666)  U G 3
Introduction to the Education of Mentally Retarded Children
Su.  A.  1 2 1/2-hr. cl.
Prereq.: Psychol. 570.
Study of causai factors, evaluations, learning potential, and general characteristics of the retarded child. Lively and Lema.

653  (713)  U G 3
Educational Planning for Mentally Retarded Children and Youth
Su, A, W.
Prereq.: 652.
A basic course for teachers and administrators which deals with curriculum goals and related educational planning for mentally retarded children and youth. Lema and Okada.

654  (718)  U G 3
Practicum in Educational Planning for Mentally Retarded Children: Communicative Arts
Su, W, Sp.  1 2 1/2-hr. cl.
Prereq.: 652 and 653.
A practicum on content, educational techniques, and methodology of teaching the communicative arts to the mentally retarded. Okada and Lively.

655  (719)  U G 3
Practicum in Education Planning for Mentally Retarded Children: Arithmetic
Su, W.  1 2 1/2-hr. cl.
Prereq.: 653.
A practicum on content, educational techniques, and methodology of teaching arithmetic to the mentally retarded. Okada.

656  (720)  U G 3
Practicum in Educational Planning for Mentally Retarded Children: Natural and Social Science
Su, Sp.  1 2 1/2-hr. cl.
Prereq.: 653.
A practicum on content, educational techniques, and methodology of teaching the natural and social sciences for the mentally retarded. Lema.

657  U G 3
Curriculum Planning for Occupational Training of the Mentally Retarded
Su, Sp.  3 cl.
Prereq.: 653.
A curriculum planning course studying the purpose, organization and administration of sheltered workshops and other work experience programs for the mentally retarded. Cavin.

659  (611)  U G 3
Techniques of Teaching Speech to the Deaf
A.  1 2 1/2-hr. cl.
Study and practice in developing speech in the deaf.

660  (650)  U G 3
Techniques of Developing Language in the Deaf
A.  1 2 1/2-hr. cl.
Prereq.: Psychol. 570 and Speech 644.
A study of the techniques and procedures for developing elementary vocabulary and syntax for deaf children.

661  (651)  U G 3
Techniques of Developing Advanced Language in the Deaf
W.  1 2 1/2-hr. cl.
Prereq.: 660.
Study of techniques and procedures for developing advanced vocabulary and syntax with deaf students.

662  (612)  U G 3
Methods in School Speech and Hearing Therapy
A, Sp.  1 3-hr. cl.
Prereq.: 285.04.
Organizing speech and hearing therapy programs in schools; state programs; professional relationships; procedures and materials for screening, scheduling, lesson planning, and evaluation. Keen.

663  (613)  U G 3
Advanced Methods in School Speech and Hearing Therapy
W.  1 3-hr. cl.
Prereq.: 662.
Advanced therapy methods and techniques for the treatment of complex speech, language, and hearing problems encountered by the school speech and hearing therapist.
665 (667) U G 3
Instructional Programs for Exceptional Children
Su, W. 1 2½-hr. cl.
Prereq.: 10 cr. hrs. in Psych.
Problems, evaluation, and adjustments related to the participation of exceptional children in the regular classroom, grades one through twelve.

666 (608) U G 3
Principles and Methods of Teaching Braille: Beginning
Su, A. 3 cl.
Theory and practice in learning and teaching braille reading and writing, including the alphabet, numerals, twenty-six one-cell whole-word signs and seventeen dot-five compound contractions. Hett.

667 (609) U G 3
Principles and Methods of Teaching Braille: Advanced
Su, W. 1 2½-hr. cl.
Prereq.: 666.
Theory and practice in learning and teaching braille reading and writing with emphasis on contractions, punctuation, and manuscript writing; preparation for certification in braille writing. Hett.

668 (619) U G 3
Principles and Methods in the Education of Partially Seeing Children
Su, W. 1 2½-hr. cl.
Prereq.: 717.
Identification of types and patterns of visual impairment; educational placement, facilities and programs for the partially seeing; impact of visual environment on sight; use of special equipment for partial seeing. Hunt.

669 (644) U G 3
Practicum in Educational Planning for Partially Seeing Children
Su, Sp. 1 2½-hr. cl.
Prereq.: 668.
Adaptations of curriculum for the partially seeing—methods and techniques; planning educational experiences; counseling and guidance for the partially seeing; observation and participation required. Hunt.

672 (770) U G 3
Introduction to Adult Education
Su, A, W, Sp. 1 2½-hr. cl.
Prereq.: 4th yr. standing; for Ed. majors 435 or 461.
The nature, extent, and significance of adult education; history and types of adult education; theoretical issues; adult learning and methodology; present trends and future developments. Ohliger.

673 (771) U G 3
Parent Education
W, Sp. 1 2½-hr. cl.
Prereq.: 14th yr. standing; for Ed. majors 461 or 435.
Nature, extent, and significance of the parent education movement; home and school relationships; methods and resources; training professional and lay leaders; local and state programs. Bowling.

675 (602) U G 4
Audio-Visual Materials of Instruction
Su, A, W, Sp. 2 cl., 2 2-hr. lab.
Prereq.: 4th yr. standing.
The contribution of audio-visual materials to educational objectives emphasizing the classroom use of such materials, utilization practices, basic sources of information, selection, and evaluation or field trips, films, records, etc. Eboch.

676 U G 3
Fundamentals of Instructional Materials and Media
A, W, Sp. 2 2-hr. cl.
Prereq.: 4th yr. standing.
Criteria and techniques for selection, distribution, utilization, evaluation and production of instructional materials; emphasis on the systems approach.

677 (601) U G 3
Radio and Television in Education
Su, A, Sp. 2 2-hr. cl.
Prereq.: 4th yr. standing.
The varied types of educational broadcasting in relation to objectives, planning, production, utilization, and evaluation. Tyler.

678 U G 4
Design of Instructional Materials
Systems Components
W. 3 cl., 1 2-hr. lab.
Prereq.: 675, or equiv.
Design, development, and production of instructional materials components for specific existing educational media sub-systems in educational agencies. Eboch and Staff.

679 U G 3
Development and Management of Instructional Systems
A. 1 3-hr. cl.
Prereq.: 675, or equiv.
Functions and operations of educational media sub-systems for varying instructional strategies; emphasis on development and management of comprehensive services for educational agencies. Eboch.

689 U G 5-15
Study Tour of Foreign Schools and Culture
Prereq.: Admission to professional standing, or grad. standing in education, and permission of instructor.
Repeatable to a maximum of 25 cr. hrs. when different areas or topics are studied.
Five weeks intensive study of educational and cultural topics fundamental to central purpose of tour, then equal period of supervised observation of schools and related cultural factors in one or more foreign countries; specific emphasis of separate tours to be announced.
690 (649) U G 3
Practicum in Problems of Public Education
Su, A, W, Sp. 3 cr.
Prereq.: 435, 461, or equiv., and permission of instructor.
Repeatable to a maximum of 9 cr. hrs.
Open to experienced teachers and administrators;
groups are organized around specific problems;
requests must be received by department chairman in
time to allow for planning.

692 (799) U G 4, 6, or 8
Education Workshops
Su. 4 cr. hrs. for 3-wk. workshops.
6 cr. hrs. for 4½-wk. workshops.
8 cr. hrs. for 6-wk. workshops.
Prereq.: Teaching experience, and permission of
workshop director.
Repeatable to a maximum of 16 cr. hrs.
Intensive study of a problem common to the
participants for the purpose of developing sound
principles and practices relating to it.

692.10 Elementary Education
692.21 Industrial Arts
692.23 Business Education
692.28 Social Studies
692.29 Distributive Education
692.32 Adult Education
692.34 Guidance
692.43 Modern Media and Materials
692.44 Educational Administration
692.47 Exceptional Children
692.49 Curriculum and Instruction
692.58 Reading

693 (600) U G 1-4
Individual Studies in Education
Prereq.: 435 or 460, and permission of instructor.

693.05 Able Student Program
693.09 Speech Education
693.10 Elementary Education
693.21 Industrial Arts Education
693.22 Trade and Industrial Education
693.23 Business Education
693.25 Teaching of English
693.26 Teaching of Mathematics
693.27 Teaching of Sciences
693.28 Teaching of Social Studies
693.29 Distributive Education
693.30 Vocational-Technical Education
693.32 Student Personnel Work
693.33 Adult Education
693.34 Guidance
693.35 Higher Education
693.36 Teacher Education
693.40 History of Education and Comparative
Education
693.41 Philosophy of Education
693.43 Radio and Television Education
693.44 Educational Administration
693.45 Teaching of Foreign Languages
693.46 Audio-Visual Materials of Instruction
693.47 Exceptional Children
693.48 Educational Development
693.49 Curriculum and Instruction
693.56 Reading

694 U G 3 or 5
Group Studies in Education
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.
Group studies on special problems in education.

694.05 Speech Education
694.10 Elementary Education
694.13 Experience in Urban Schools
694.21 Industrial Arts Education
694.22 Trade and Industrial Education
694.23 Business Education
694.25 Teaching of English
694.26 Teaching of Mathematics
694.27 Teaching of Sciences
694.28 Teaching of Social Studies
694.29 Distributive Education
694.30 Vocational-Technical Education
694.32 Student Personnel Work
694.33 Adult Education
694.34 Guidance
694.35 Higher Education
694.36 Teacher Education
694.40 History of Education and Comparative
Education
694.41 Philosophy of Education
694.43 Radio and Television Education
694.44 Educational Administration
694.45 Teaching of Foreign Languages
694.46 Audio-Visual Materials of Instruction
694.47 Exceptional Children
694.48 Educational Development
694.49 Curriculum and Instruction
694.50 Educational Change
694.56 Reading

712 (617) U G 3
Evolution of Instruction
and Guidance of the Deaf
W. 1 2½-hr. cr.
Prereq.: Psychol. 570.
Evolution of the oral and manual approaches of
instruction of the deaf and their implication for the
life adjustment problems of the deaf.

713 (734) U G 4
Teaching Reading and Arithmetic to the Deaf
Sp. 4 cr.
Prereq.: 660.
Developing skills in reading arithmetic in the deaf.

714 (735) U G 3
Teaching Social Studies and Science to the Deaf
Sp. 3 cr.
Prereq.: 713.
Teaching skills in academic subjects to the deaf on
the intermediate and high school levels.

715 (736) U G 3
Education of Multihandicapped Children
Su, Sp. 1 2½-hr. cr.
Prereq.: Psychol. 570.
Differential diagnosis, classification, educational
placement, and adjustment of multihandicapped
children, Okada.
717 (730) U G 3
Education Implication of Visual Impairments
Su, A. 1 2½-hr. cl.
Prereq. or concur.: Psychol. 570.
A course for school personnel, including a survey of the structure, function, and hygiene of the eyes with emphasis on educational implications of visual disabilities of blind and partially seeing children. Hunt.

718 (766) U G 3
Education of the Emotionally and Socially Maladjusted
Su, Sp. 1 2½-hr. cl.
Prereq.: Psychol. 570.

719 (732) U G 3
Theory and Practice in the Education of Blind Children
Su, Sp. 1 2½-hr. cl.
Prereq.: 717.
Current theories and techniques in the education of blind children; adapting general curriculum, specialized content, materials, and equipment for the blind child. Hunt.

722 (722) U G 3
The School in American Culture
A. 1 cl., 1 3-hr. lab. Field trips arr.
Prereq.: 15 cr. hrs. of professional study in Ed.
Open only to new international students. An orientation to the contemporary American school by direct observation correlated with study of major historical forces affecting education. Sutton.

723 (777) U G 3
Comparative Education
Su, A, Sp. 1 2½-hr. cl.
Prereq.: 632 or 636.
Social and cultural factors influencing the differential development of educational institutions and organization. Sutton.

724 (778) U G 3
Historical and Cultural Factors in the Evolution of Educational Systems
W, Sp. 1 2½-hr. cl.
Prereq.: 632 or 636.
Social and historical factors affecting stability and effectiveness of educational institutions and organization in countries where programs of universal education are of recent origin. Sutton.

725 U G 3
Education and National Development
A, Sp. 1 3-hr. cl.
Roles of education in national economics and social development; includes strategies for educational development and introduction to educational planning. Sanders.

732 U G 3
Corrective Reading
Su, A. 1 2½-hr. cl.
Prereq.: 435 or 513, and Psych. 230. Diagnostic techniques and instructional methods and materials useful to the elementary and secondary classroom teacher in helping individuals and small groups of problem readers. Huelman.

768 U G 3
Directing Student Teachers
Su, A, W, Sp. 1 2½-hr. cl.
Prereq.: Bachelor's degree, teacher's certificate, and teaching experience. Principles and techniques for directing the laboratory experiences of student teachers and other teacher education students. Andrews.

785 (710) U G 5
Introduction to Inquiry, Principles, Strategies, and Techniques
Su, A, W, Sp. 2 2-hr. cl., 1 2-hr. lab.
Prereq.: Permission of instructor. Introduction to inquiry strategies and their role in educational development; emphasis is on the conceptualization of educational problems.

786 U G 5
Introduction to Inquiry: Quantitative Methods
Su, A, W, Sp. 2 2-hr. cl., 1 2-hr. lab.
Prereq.: 785 or equiv., or permission of instructor. An introduction to quantitative techniques, with emphasis on application in educational settings. Bargar, Glatt, and Sanders.

787 U G 3
Classroom Test Construction
W. 1 3-hr. cl.
Prereq.: 4th yr., or grad. standing. General principles and techniques for construction and utilization of classroom tests for assessment of student achievement. Cook and Hammend.

788 U G 4
Systems Concepts in Education
Su, A, Sp. 2 2-hr. cl.
Prereq.: 4th yr., or grad. standing. Introduction to general systems theory and an overview of its utilization and application in the field of education. Cook and Trzebiatowski.

H799 U G 3 or 5
Honors Course
Prereq.: 4th yr. standing and permission of the adviser under whose supervision the work is to be completed, and the College Honors Committee. Repeatable to a maximum of 15 cr. hrs. A program of reading and research for each student, with individual conferences, reports, and honors thesis.
Principles of Business Education
Su, A, Sp. 1 2/3-hr. cl.
Open only to grad. students majoring in business ed., distributive ed., or vocational ed.
Meaning, purpose, and scope of the business education program; analysis of principles and fundamental issues. Hanna.

Organization and Teaching of Office Practice
Su, W. 3 cl.
Prereq.: Bus. Admin. 301 or equiv.
The purposes, content, organization, materials, and methods of evaluation for an office practice course; office practice as a part of an intensive vocational curriculum. Wells.

Administration and Supervision of Business Education
Su, A. 1 2/3-hr. cl.
Prereq.: Grad. status in business or vocational ed.
Administrative problems in business education related to program, facilities, placement and follow-up of graduates, public relations, and federal-state reimbursement. Jennings.

Improvement of Instruction in Basic Business Subjects
Su. 3 cl.
Prereq.: 534, or equiv.
A study of objectives, methods, materials, and methods of evaluation for courses such as general business, consumer education, and business law. Wells.

Improvement of Instruction in Bookkeeping and Data Processing
Prereq.: 523, or equiv.
Evaluation of the content, materials, and methods of teaching bookkeeping, accounting, and data processing on the secondary and post-secondary school levels. Hanna.

Improvement of Instruction in Secretarial Subjects
Su. 2 cl.
Prereq.: 520 and 521, or equiv.
Teaching procedures basic to the development of vocational proficiency in typewriting, shorthand, and transcription; available instructional materials, evaluation, standards of achievement. Wells.

Survey of Vocational Education
Su, A. 1 2/3-hr. cl.
Prereq.: 435, or equiv.
Open to vocational educators, school administrators, industrial arts students, and other graduate students who desire information about vocational education. A survey of vocational education, vocational guidance, and industrial arts. Vivian.

Science in Elementary Education
A, Sp. 1 2/3-hr. cl.
Prereq.: 585, or 587, or 3 yrs. of teaching experience.
Problems of elementary school science instruction with emphasis on pertinent literature and classroom implementation of current developments in science curriculum and methodology. Languis and Cunningham.

Mathematics in Elementary Schools
Su, A. 1 2/3-hr. cl.
Prereq.: 585, or 587, or 3 yrs. of teaching experience.
Applications of research and theory to improve children's competencies in computation and problem solving; organization of instructional programs and contemporary instructional questions are considered. Herding and Stull.

Language Arts in the Elementary School
Su, A, W. 1 2/3-hr. cl.
Prereq.: 585, or 587, or 3 yrs. of teaching experience.
Problems, research, and current methods of teaching the four major areas of the language arts in the elementary school; listening, speaking, reading, writing. King.

Social Studies in the Elementary School
Su, W. 1 2/3-hr. cl.
Prereq.: 585, or 587, or 3 yrs. teaching experience.
The educational values of social studies, reasons for, and ways and means of integrating the social sciences with emphasis upon program innovations and research. Tomlinson.

Guidance Problems in the Elementary School
Su, A, Sp. 1 2/3-hr. cl.
Prereq.: 585, or 587.
Selected problems which the elementary teacher faces in providing individual, small-group, and large-group guidance. Tomlinson.

Advanced Course in Children's Literature
Su, A, W, Sp. 1 2/3-hr. cl.
Prereq.: 467, or 823.
An evaluation of the changing role and increased importance of literature in the education of children and youth today. Huck and Koste.

Foundations of Elementary Education
Su, A, Sp. 1 2/3-hr. cl.
Utilization of research in the basic sciences in developing background and understanding of current trends in elementary education; critical examination of current theories. Frazier.

The Changing American Elementary School
Su, A, W. 1 2/3-hr. cl.
Prereq.: 585, or 587, or teaching experience.
Involves investigation of objectives, issues, and curriculum organization of the modern elementary school program. Burr.
820  (749)  G 3  
Evaluation in Elementary Schools
Su, Sp.  1 2/3-hr. cl.
Prereq.: 545, or 547, or teaching experience.
Appraisal of materials and methods in terms of educational aims and research findings; consideration of instruments and procedures for comparing achievements with established objectives. Harding.

821  (753)  G 3  
School Problems in Child Development
Su, W, Sp.  1 2/3-hr. cl.
An advanced course based upon research in education and related fields which aids the teacher in guiding developmental activities of children in the elementary school.

823  G 3  
Creative Experiences in the Elementary School Curriculum
Su, A.  3 cl.
Study of the nature of creativity and aesthetics as related to the elementary school curriculum. Koste.

824  G 3  
Designing School Programs for Children Age Two to Six
Su, A.  3 cl.
A study of the characteristics and needs of children two to six years of age as they are related to the development of educational programs. Miller and Leter.

827  G 3  
Advanced Study in the Teaching of Developmental Reading
Su, A, W.  1 2/3-hr. cl.
Designed to provide experienced teachers the opportunity to extend and update their knowledge of the reading process and the principles underlying effective reading instruction. Emans.

828  (731)  G 3  
Trends and Issues in Teaching Reading in the Elementary School
Su, A, Sp.  1 2/3-hr. cl.
Prereq.: 813, or permission of instructor.
Designed for experienced teachers and curriculum workers; current developments, trends, and issues critically analyzed according to available research evidence, King and Emans.

829  (864)  G 3  
Problems in Elementary School Curriculum and Supervision
Su, A, Sp.  1 2/3-hr. cl.
Prereq.: 819 and 861.
An analysis of the programs and practices involved in facing major curriculum problems in the elementary schools; supervision and curriculum will be synthesized. Frazier.

832  (655)  G 3  
Industrial Arts in the Elementary School
Su, Sp.  3 cl.
Prereq.: 120 or 243 or equiv.
Selection, development, and evaluation of typical experience units in both classrooms and practical arts laboratory situations at all levels of the elementary schools. Lux.

833  (714)  G 3  
Industrial Arts Curriculum Planning
Su, A.  1 2/3-hr. cl.
Prereq.: 587, or equiv.
Review of resource reports, general and special criterion developments formulation of curriculum guides, and laboratory manuals of instruction. Lux and Ray.

834  (715)  G 3  
Planning Industrial Arts Facilities
Su, W.  1 2/3-hr. cl.
Principles of industrial arts and technical laboratory planning including equipment selection for all school levels and meeting all curriculum requirements. Ray.

835  (815)  G 3  
Organization and Administration of Industrial Education
Su, W.  1 2/3-hr. cl.
Prereq.: 836.
International and historic background curriculum resources and development, physical organization, administrative organization, supervisory operation, and professional policies. Lux.

836  (856)  G 3  3-5  
Practicum in Industrial Arts Education
A.  3 cl.
Prereq.: 897.
Derivation of doctrine, formulation, and evaluation of basic programs, curriculum development, organizational implementation, leadership problems, and professional progress, both here and abroad. Lux.

837  (866)  G 3  
Research in the Laboratory of Industries
Sp.  3 cl.
Prereq.: 833 or 834, teaching experience in Indust. Arts or Vocational Industr., Ed., and permission of instructor. Individual or group studies on a conference and laboratory basis, with the publication of either a professional or technical bulletin as a goal. Ray.

839  (779)  G 3  
Applied Linguistics in the Teaching of Foreign Languages
W, Sp.  3 cl.
Prereq.: 15 cr. hrs. in Ed., Ling. 601, and at least one French or Span. course on the 600 level.
Analysis of research in applied linguistics; construction of drills, laboratory exercises, and tests; lexical items and structural inventory of French or Spanish. Allen.
  a. W.  French
  b. Sp.  Spanish

841  (761)  G 3  
The Use of Certain Concepts of Philosophy and Logic in the Teaching of Mathematics
Sp.  3 cl.
Prereq. or concur.: 621, or equiv.
A study of the role of physical materials and certain concepts of philosophy and logic in the teaching of arithmetic, algebra, and geometry.
842 G 3
Number Concepts in School Mathematics
A. 2 1/2-hr. cl.
Prereq.: 841 or permission of instructor.
The concept of number systems from the point of view
of a teacher who plans to introduce them to students
in grades K-12.

843 G 3
Algebraic Concepts in School Mathematics
Su, W. 2 1/2-hr. cl.
Prereq.: 841, and undergraduate major or minor in
Math. or permission of instructor.
Such concepts as algebraic structures, order structures,
and relation and function as unifying themes for
school mathematics.

844 G 4
Geometric Concepts in School Mathematics
Su, Sp. 4 1-hr. or 2 2-hr. cl.
Prereq.: 841, or permission of instructor.
The historical and contemporary role of geometry in
school mathematics; review of research, analysis of
current programs and the teaching of selected
concepts.

845 G 4
Curriculum and Supervision
in School Mathematics
Su, W. 4 cl. plus observation and participation in
selected schools.
Prereq.: 842, 843, 844, or permission of instructor.
The role of state and local supervisors in the design,
implementation, and supervision of school mathematics
programs (K-12) with analysis of contemporary
programs and materials of instruction.

847 G 3
Preparation of Handicapped Children
for Post-School Adjustment
1 1/2-hr. cl.
Prereq.: Psychol. 570 or 853, and permission of
instructor.
Study of the roles of education, guidance, work
experience, placement, and follow-up service in helping
handicapped children adjust to employment, family,
and community life.

848 G 3
Organization of Programs for Exceptional Children
Sp. 2 1/2-hr. cl.
Prereq.: Permission of instructor.
Planning and financing of educational programs for
children who are gifted, mentally deficient, blind,
partially hearing, deaf, hard of hearing, emotionally
disturbed, or who have learning problems or other
handicaps.

849 G 4
The Supervision of School Science Programs
A. 4 cl.
Prereq.: 551 or equiv., and teaching or supervisory
experience.
For those concerned with supervision of teacher
education programs in science; objectives, curricula,
recent trends, classroom management, evaluation of
teaching, professional literature.

850 (712) G 4
Science in the School Curriculum
Su, W. 2 2-hr. cl.
Prereq.: 551 or equiv., and teaching or supervisory
experience.
Foundations for science curriculum, current
developments, planning and evaluation procedures,
research.

851 G 4
Science Education in Higher Education
Sp. 2 2-hr. cl.
Prereq.: 551 or equiv., and 849 or 850, or equiv.
Course and curricula for teacher preparation programs
in science, clinical experience including student
teaching, facilities, evaluation, and research, and the
role of science education centers.

853 G 3
Reading in the Secondary School
Su, Sp. 3 cl.
Prereq.: Student teaching or permission of instructor.
Critical study of objectives, content, and organization
of reading programs in secondary schools. Rental.

854 G 3
Reading in Its Social Setting
Sp. 3 cl.
Prereq.: Permission of instructor.
The influence of culture on the nature, quality, and
quantity of reading development; the relationship of
reading to language development and mass media.

855 G 3
Practicum in Reading
Sp. 1 cl., lab. arr.
Prereq.: Permission of instructor.
Application of research, diagnostic, prognostic, and
program development methodology in field settings.

859 G 3
The Junior High School Curriculum
A. 1 1/2-hr. cl.
Prereq.: 435, or equiv.
A study of the various types of junior high school
programs, with special emphasis upon teaching-
learning procedures as they apply to the early
adolescent years. Alberty.

860 (701) G 3
Fundamentals of Curriculum
Su, A, W, Sp. 1 1/2-hr. cl.
Prereq.: 818, or 862.
Not open to students with credit for 868.
A beginning course in curriculum designed to serve as
an overview of the field of curriculum and instruction:
kindergarten through 12th grade. Alberty and Klohr.

861 (702) G 3
Fundamentals of Supervision
Su, A, W, Sp. 1 1/2-hr. cl.
Prereq.: 860.
A beginning course in supervision of instruction
emphasizing general principles and practices in
elementary and secondary schools. Frymier and
Galloway.
862 (703) G 3
The Role of the School in the Social Order
Su, A, W, Sp. 1 2½-hr. cl.
Prereq.: 505 or 507, or equiv.
An orientation course for teachers and administrators which deals with the basic purposes of secondary education in relation to major issues and current trends. Bourgeois.

863 (708) G 3
Evaluation in Secondary Schools
Su, A, Sp. 1 2½-hr. cl.
Prereq.: 565 or 567, or equiv.
Study of techniques of evaluation in secondary schools; attention is given to current evaluation practices with emphasis on procedures appropriate to Ohio Schools. Duncan.

864 (705) G 3
Fundamentals of Instruction
Su, A, Sp. 1 2½-hr. cl.
Prereq.: 585 or 587, or equiv.
Survey of instructional theory and related behavioral science disciplines; emphasis is on application of principles of instructional theory to classroom teaching. Duncan and Hough.

865 (863) G 3
Curriculum Theory
W, Sp. 2 3½-hr. cl.
Prereq.: 861, or equiv.
An advanced course in curriculum: kindergarten through 12th grade. Klohr.

866 (868) G 3
Supervision Theory
Su, Sp. 2 3½-hr. cl.
Prereq.: 861, or equiv.
An advanced course in supervision of instruction: kindergarten through 12th grade. Galloway.

867 (804) G 2-5
Educational Experimentation
Su, A. 1 2-hr. lab., conf. arr.
Prereq.: 858 or equiv., and 15 cr. hrs. of grad. work in Ed.
Repeatable to a maximum of 5 cr. hrs.
Analysis of contribution of selected experiments to elementary, secondary, and higher education; design of experimental method for attacking educational problems. Duncan.

868 (831) G 3
Laboratory in Curriculum Development in Secondary Schools
Sp. 1 2½-hr. cl.
Prereq.: 862, or equiv.
An advanced course in techniques of curriculum development and organization; study of specific problems in curriculum development which are of concern to the students enrolled. Alberty.

869 (841) G 3
Guiding Learning Activities in the Secondary School
Su, W. 1 2½-hr. cl.
Prereq.: 862 and 864.
An advanced course dealing with basic principles and generalized techniques involved in developing, organizing, and evaluating learning activities. Hough.

870 (885) G 4
Practicum in Curriculum and Supervision
A. 1 cl., lab. arr.
Prereq.: Master’s degree and 861.
Not open to students with credit for 868.
A study of the literature and methods of curriculum development and supervision of instruction in a field setting. Galloway.

871 (886) G 4
Practicum in Curriculum and Supervision
W. 1 cl., lab. arr.
Prereq.: Master’s degree, 861 and 870.
Continuation of 870. Tyler.

872 (887) G 4
Practicum in Curriculum and Supervision
Sp. 1 cl., lab. arr.
Prereq.: Master’s degree, 861 and 871.
Continuation of 871. Klohr.

873 (865) G 3
Problems of Secondary School Supervision and Curriculum Development
Su, A. 1 2½-hr. cl.
Prereq.: 860.
Not open to students with credit for 868.
An advanced course in supervision and curriculum development emphasizing the problem involved in initiating and conducting change in the secondary school curriculum. Frymier.

874 (750) G 3
Introduction to Guidance Services
Prereq.: 435.
Background and purposes of guidance services; techniques used in studying the individual; informational services; counseling service: placement and follow-up; developing a guidance program. Quaranta, Reaydon, Riccio, and Wiglit.

875 (752) G 3
Group Processes
Su, A, W, Sp. 1 2½-hr. cl.
Prereq.: Permission of instructor.

876 (754) G 3
Organization and Administration of Guidance Services
Su, A, W. 3 cl.
Prereq.: 874, or equiv.
The selection, organization, and presentation of guidance materials, including analysis of types of organization, methods of initiating a guidance program, and types of in-service programs. Riccio.
877 (755 A)  G 3
Guidance Appraisal Techniques
Su, A, Sp.  1 2½-hr. cl.
Prereq.: 874.
Basic concepts and techniques in the appraisal of the individual; non-standardized methods. Appleton and Ingersoll.

878 (755 B)  G 3
Guidance Appraisal Techniques
Su, W.  1 2½-hr. cl.
Prereq.: 874.
Basic concepts and techniques in the appraisal of the individual; standardized methods. Appleton and Kemp.

879 (756)  G 5
Educational and Vocational Guidance
Su, A, W, Sp.  1 2½-hr. cl., 1 2-hr. lab.
Prereq.: 874.
Theories, instruments, resources for educational and vocational guidance of elementary and secondary students including an analysis of post-secondary school educational opportunities. Quaranta, Reymard, and Weaver.

880  G 3
Guidance Practices in the Elementary School
Su, A, Sp.  1 2½-hr. cl.
Prereq.: 874.
The application of guidance concepts and services to the elementary school situation. Quaranta.

884 (538)  G 3-6
Internship in Teaching
Prereq.: Permission of area adviser.
Not open to students with credit for 589.
Repeatable to a maximum of 12 cr. hrs.
Planned professional teaching experience toward certification for post-degree students.

885 (764)  G 3-6
Supervised Teaching in Special Education
Prereq.: Permission of instructor.
Not open to students with credit for 710.
Repeatable to a maximum of 12 cr. hrs.
Student teaching for qualified students in the area of special education. Fee.
885.52 Blind and Partially Seeing
885.54 Mental Retardation
885.55 Deaf and Hard of Hearing

889  G 3-5
Practicum in Educational Communication
W, Sp.  2 cl., 3-4 hrs. arr.
Repeatable to a maximum of 10 cr. hrs.
Observation, limited participation and functional analysis of production, distribution and management operations in selected media centers, and broadcast facilities or film agencies.

899  G 1-5
Interdepartmental Seminar
A, Sp.
(See under Interdepartmental Seminars.)
Hack and Nybrand.

911 (757)  G 3
Conceptions of Mind in Educational Theory
A.  1 2½-hr. cl.
Prereq.: 637, or equiv.
A study of the doctrines of the mind that have exercised a determining influence upon educational theory and practice. Reagan.

912 (758)  G 3
The Thinking Process in Its Educational Bearings
Su, Sp.  1 2½-hr. cl.
Prereq.: 637, or equiv.

913 (759)  G 3
Modern Trends in Educational Philosophy
Su, A, W, Sp.  1 2½-hr. cl.
Prereq.: 637, or equiv.

914 (760)  G 3
Religion and Public Education
Su, Sp.  1 2½-hr. cl.
Prereq.: 637, or equiv.
Alternative conceptions of teaching sectarian religion in the public schools; present educational practices, court decisions and controversial proposals. Kircher.

915 (809)  G 3
Social Philosophies and Their Educational Bearings
Su, W.  1 2½-hr. cl.
Prereq.: 637.
A study of social philosophies in terms of their significance for educational procedures and programs. Reagan.

916 (810)  G 3
The Educational Philosophy of John Dewey
Sp.  1 2½-hr. cl.
Prereq.: 912, or equiv.
A systematic study of the writings of John Dewey in their bearings upon educational theory and practice. Kircher.

917 (859)  G 3
Comparative Philosophy of Education
W.  1 2½-hr. cl.
Prereq.: 912, 913, or equiv.
Advanced Concepts in Elementary School Science Education
W. 3 cr.
Prereq.: 311, or permission of instructor.
Emphasis on functions of leadership personnel in developing and improving elementary school science programs and on evaluation of current developments and research. Cunningham.

A Guided Survey of Research in Reading
Su, Sp. 1-3 hr. cr.
Prereq.: 6 cr. hrs. in grad. reading courses.
Repeatable to a maximum of 6 cr. hrs.
Provides acquaintance with scientific studies relating to reading, methods used, results attained, including implications and limitations, and the problems meriting further investigation. Emans.

Problems in Curriculum and Instruction in Inner-City Schools
Su, W. 3 cr.
Prereq.: 860, 861, or equiv.
An analysis of current problems and examination of related research in the field of curriculum and instruction in inner-city elementary and secondary schools. Bourgeois.

Seminars in Education
Prereq.: Permission of instructor.
Students with permission of advisers may register for more than one section of 925 or for the same section two or more times.
Research Problems in:
925.09 Speech Education
A. The Basic-College Speech Course. Douglas.
A. Modern Trends in Speech Education. Lewis.
W. Significant Contributors to Contemporary Communications. Douglas.
W. Creative Drama and Children’s Theatre. Lewis.
Sp. Speech Facilities and Resources. Lewis.
925.10 Elementary Education:
Early and Middle Childhood Education
Advanced concepts in elementary school mathematics education. Stull.
Learning resources in early childhood education. Lelah.
General elementary for Ph.D. students. Tomlinson.
925.21 Industrial Arts Education
Ray.
925.22 Trade and Industrial Education
Su, W.
Reese.
925.23 Business Education
Su, W.
Hanna and Wells.
925.25 Teaching of English
Batanom and Eberhart.
925.26 Teaching of Mathematics
925.27 Teaching of Sciences
Schlessinger.
925.28 Teaching of Social Studies
Gilliom, Jewett, and Muesig.
925.29 Distributive Education
Vivian.
925.30 Vocational-Technical Education
Su, Sp.
Reese.
925.32 Student Personnel Work
Silverman and Tripp.
925.33 Adult Education
Dowling and Ohliger.
925.34 Guidance
Kemp, Petos, Quaranta, Reynard, Riccio, and Wigtii.
925.35 Higher Education
Laughlin.
925.36 Teacher Education
Andrews, Coon, and Cottrell.
925.40 History of Education and Comparative Education
Mehl and Sutton.
925.41 Philosophy of Education
925.43 Radio and Television Education
Su, W.
Tyler.
925.44 Educational Administration
Laughlin and Nystrand.
925.45 Teaching of Foreign Languages
Su, W.
Otto and Pimsleur.
925.46 Audio-Visual Communication
A.
Dale.
925.47 Exceptional Children
Cassidy, Johnson, and Lema.
925.49  Educational Development
Novak and Cook.
925.49  Curriculum and Instruction
Duncan, Frymier, Klohr, and Trzebiatowski.
925.50  Educational Change
Blanke, Glatt, and Sanders.
925.56  Reading
King and Emans.

927  (711)  G 3
History of the Universities
Su, W.  2 1/2-hr. cl.
The university as an institution through ten centuries; patterns of development in different countries; German, English, American contributions to the idea of the American university. Sutton.

928  (775)  G 3
The History of Educational Thought: Ancient and Medieval
Su, A.  1 21/2-hr. cl.
Prereq.: 632, or 636.
Study and analysis of the major educational theories of the ancient and medieval periods including the educational writings of Plato, Aristotle, and St. Augustine. Gehl.

929  (776)  G 3
The History of Educational Thought: Modern
Sp.  1 21/2-hr. cl.
Prereq.: 632, or 636.
Study of the major educational theories since 1500 including Montaigne, Milton, Locke, and Rousseau and their influence on contemporary educational theory and practice. Gehl.

931  (774A)  G 3
General Methods in Adult Education
W.  1 21/2-hr. cl.
Prereq.: Permission of instructor.
The psychological and sociological factors affecting adults as learners; the uses and adaptations of various methods and techniques for teaching adults. Dowling.

932  (774B)  G 3
Discussion Methods in Adult Education
Sp.  1 21/2-hr. cl.
Prereq.: 672, and permission of instructor.
The roundtable, forum, panel symposium, and other forms of discussion as applied to adult groups; laboratory practice; clinical analysis of individual difficulties. Ohtiger.

933  G 9
Internship in Adult Education
Prereq.: 672, and 12 cr. hrs. of grad. work in Adult Education.
Repeatable to a maximum of 18 cr. hrs.
Limited to Ph.D. majors in Adult Education and selected master's candidates with major in adult education.

934  (898)  G 3
Organization and Administration of Adult Education Programs
A, W.  2 11/2-hr. cl.
Prereq.: 672, and permission of instructor.
Methods of determining needs, developing programs, staffing, financing, evaluating, and improving adult education programs in colleges and universities, public schools, and other agencies. Dowling.

935  (832)  G 3
The Community College
A, Sp.  2 11/2-hr. cl.
Not open to students with credit for 996 or 939.
History of community colleges; evaluation of organization and administration; campus planning; and federal, state, and local governmental relations with these colleges. Laughlin.

936  G 3
Curriculum and Instruction in the Community College
Su, W.  2 11/2-hr. cl.
Not open to students with credit for 907.
Review of sociological technological changes affecting higher education; analysis of curriculum, instruction, counseling, and community services; and summary of characteristics of students and faculty. Laughlin.

937  G 3
Direct Experiences in Teacher Education
Su, W, Sp.  3 cl.
Prereq.: Master's degree, college supervision of student teachers, or permission of instructor.
An analysis of student teaching and related direct experiences in teacher education with special emphasis on the theoretical basis, purposes, organization, curriculum patterns, evaluation, administration, and problems in the design of experiences. Andrews.

938  G 3
Instruction in Higher Education
Sp.  3 cl.
A study of the teaching-learning environment in college, including student culture, learning theory and classroom procedure, examinations, and evaluation.

940  (845)  G 3
Administration of Higher Education 1
Su, A, W.  2 2-hr. cl.
A study of the purposes and scope of higher education; the patterns of general control; theories of administration, allocation of function, and coordination in higher education. Laughlin.

941  (848)  G 5
Theories and Curricula of Higher Education
Su, A, W.  2 2-hr. cl., 1 hr. arr.
A study of various theories of education, representative and experimental college programs in the United States. Kircher.
942 (854) G 3
Administration of Higher Education II
A, Sp. 2 1½-hr. cl.
Prereq.: 940.
Principles and problems of control, allocation of function, coordination, financial support, business administration, and evaluation in higher education, including graduate and professional education. Laughlin.

943 (855) G 3
Interaction of the Student and the College Environment
Sp. 2 1½-hr. cl.
A focus on the nature of the college environment, entering student, academic procedures, student performance, and student culture for those planning careers in college student personnel work. Austin.

944 (850) G 5
Curriculum in Teacher Education
Su, A, Sp. 2 2-hr. cl., 1 hr. arr.
Prereq.: 860, or permission of instructor.
Bases and development of curriculum in teacher education (process and product); comparative study of programs for the preparation of teachers; analysis of the implications of current research for programs of teacher education. Cottrell.

946 (727) G 3
Structure and Organization of American Educational Systems
Prereq.: 585, or 587, or equiv.
Local, state, and national structures are analyzed and educational policy-making and control processes are delineated. Candoli, Hack, Nystrand, and Wagstaff.

947 (808) G 3
Theory in Organization and Administration of School Systems
Su, A, W, Sp. 1 3-hr. cl.
Prereq.: 946.
Consideration of formal and informal organization and other relevant theories of organizational structure and interpersonal behavior. Candoli, Hack, Laughlin, and Staub.

948 (825) G 3
The Elementary School Principalship
Su, W. 1 2½-hr. cl.
Prereq.: 946.
Emphasis is given to the elementary-school principal's role in providing leadership in policy-making, personnel matters, public relations, research, and business management. Staub.

949 (844) G 3
Administration of Secondary Schools
Su, W, Sp. 1 3-hr. cl.
A study of educational administration in the secondary school with emphasis on problems and issues in organization, personnel, public relations, instructional leadership, and management. Wagstaff.

950 (870) G 3
Problems of Beginning Superintendents
Su, Sp. 1 2½-hr. cl.
Prereq.: 946.
Definition of the superintendent's role, and the roles of the board of education, school staff, and community; examination of problems indigenous to conflict among roles. Hack and Staub.

951 (871) G 3
Administrative Problems of the City School System
Su, W. 1 3-hr. cl.
Prereq.: 946.
A study of problems of educational administration in the complex city school system with emphasis on solution of educational problems caused by the unique demographic characteristics of the city. Candoli and Hack.

952 (823) G 3
Legal Aspects of School Administration
Su, A, Sp. 1 2½-hr. cl.
Prereq.: 946, or equiv.
A study of statutory and case law, legal principles and provisions relevant to educational administration, particularly in the areas of personnel, finance, curriculum, contracts, property, liability, and organization. Staub.

953 (853) G 3
School Community Relations
Su, W, Sp. 1 2½-hr. cl.
Prereq.: 946, or equiv.
Principles and practices in developing and maintaining appropriate school community relationships; professional and lay roles; institutional relationships; opinion analysis; communication processes; decision-making patterns. Nystrand and Staub.

954 (872) G 3
Theory and Practice of Student Personnel Administration
W. 1 3-hr. cl.
The organization and administration of student personnel services—legal phases of the program, policy development and staffing relationships are considered.

955 (873) G 3
Staff Personnel Administration
Su, A, Sp.
Prereq.: 946.
A study of personnel administration in educational institutions; theory, principles and practices as they relate to personnel policy, recruitment, selection, orientation, appraisal, in-service education, promotion, collective negotiations, general welfare. Larmee.

956 (875) G 3
School Finance
Su, A, Sp. 1 3-hr. cl.
Prereq.: 946.
Examination of the theory and economics of financing public education; emphasis on sources of revenue, variations in ability and effort, state-local plans, and the federal role. Hack.
Business Administration of Schools
Su. W.  1 3-hr. cl.
Prereq.: 946.
Function and role of business administrators in
schools; emphasis on budgeting; payroll and accounting
purchasing; planning, constructing, operating, and
maintaining the school plant. Hack.

School Plant Planning
Su. W.  1 2-hr. cl., 1-hr. arr.
Prereq.: 946, or equiv.
Problems and techniques in determining educational
facility needs, evaluating facilities, planning for new
construction and remodeling, utilizing specialized
personnel; related legal and financial aspects. Conrad
and Wohlers.

Practicum in Educational Administration I
A.  1 cl., lab. arr.
Prereq.: 946, master's degree, 2 yrs. teaching
experience or equiv., and permission of instructor.
Analysis of significant research in educational
administration. Candoll.

Practicum in Educational Administration II
W.  1 cl., lab. arr.
Prereq.: 959.
Advanced study of administrative problems and
organizational behavior from an inter-disciplinary
perspective. Staub.

Practicum in Educational Administration III
Sp.  1 cl., lab. arr.
Prereq.: 960.
Continuation of 960. Wagsstaaff.

Seminar in Foreign Language Education
Sp.  2 2-hr. cl.
Prereq.: 858, undergraduate major in foreign language.
Analysis of major research studies and projects in the
teaching and learning of foreign languages; evaluation
and implications of findings. Allen.

Foreign Language Testing
A.  3 cl., and field work.
Prereq.: Permission of instructor.
Theory and practice of foreign language test
construction including item writing, item analysis,
reliability, validity, scoring and interpretation. Pimsleur.

Experimental Design in Education
W, Sp.  3 cl., 1 1-hr. lab.
Prereq.: Introductory inferential statistics, or
permission of instructor.
Experimental design will be studied with emphasis
placed upon features most frequently encountered in
teaching research and upon acquisition of
quantitative understandings in laboratory setting.

Evaluation Functions
and Methodology in Education
A, Su.  3 cl.
Prereq.: Psychol. 510, or equiv.
The functions and methodology of evaluation relative
to planned educational change, with emphasis on the
relationships between data collection, analysis,
reporting and relevant decision processes. Stufflebeam.

Research Process:
Practicum in Educational Research
3 cl.
Prereq.: Previous courses in the basic sequence in
educational research methodology, or permission of
instructor.
The utilization of research strategies in the pursuit of
educational problems, with emphasis upon
the development, conduct, and completion of individual
projects.

Research Management
Sp.  2 1/2-hr. cl.
Prereq.: Permission of instructor.
The use of management information systems in the
planning and controlling of educational research and
development projects, with particular emphasis on
network planning techniques. Cook.

Problems in the Development
of Research Projects
A.  3 cl.
Prereq.: Permission of instructor.
A discussion of conceptual, methodological and
communication problems encountered in the
development of research projects; faculty members
engaged in project development are invited to
take part. Novak.

Planning-Programming-Budgeting System
in Education
W.  1 3-hr. cl.
Principles and problems associated with utilization of
planning-programming-budgeting system as for
educational decision-making and resource allocation.
Cook and Anderson.

The English Curriculum:
Language and Composition
Su, W.  3 cl.
Prereq.: 20 cr. hrs. in Ed., and 25 cr. hrs. in Engl.
An evaluation of current trends and developments in
linguistics and composition instruction and their
relevance for the English curriculum. Bateman.

The English Curriculum: Literature
Su, Sp.  1 2 1/2-hr. cl.
Prereq.: 20 cr. hrs. in Ed., and 25 cr. hrs. in Engl.
Critical examination of trends in the secondary school
literature program, including programs for the able
and the disadvantaged student; basic objectives, types
of organization, technique of developing literary
appreciation. Eberhart.
The English Curriculum: Studies in the Teaching of Literature
W, 1 1/2-hr. cl.
Prereq.: 20 cr. hrs. in Ed., and 25 cr. hrs. in Engl.; familiarity with contemporary critical thought.
Role of literary theory and aesthetics in English curriculum development; study of the relation of linguistics to literature and of literature to the other arts. Stewart.

Introduction to Counseling
Su, A, W, Sp. 2 1/2-hr. cl.
Prereq.: 874.
Emphasis on theoretical bases of counseling and on the counseling relationship.

Supervised Practice in Individual Counseling: Children
W, Sp. 1 1/2-hr. cl.
Prereq.: 874, 973 or Psychol. 882, and permission of instructor.
Repeatable to a maximum of 9 cr. hrs.
Emphasis on counseling techniques unique to elementary age children including play media and conceptualizing the environmental press on the child. Guaranta and/or staff.

Supervised Practice in Group Counseling: Children
Sp. 1 1/2-hr. cl.
Prereq.: 874, 973 or Psychol. 882, and permission of instructor.
Repeatable to a maximum of 9 cr. hrs.
Supervision of each enrollee who counsels a group of children of elementary age in a school or other institutional setting. Guaranta and Kemp.

Supervised Practicum in Individual Counseling: Adolescent and Adult
Su, A, W, Sp. 1 1/2-hr. cl.
Prereq.: 874, 973 or Psychol. 882, and permission of instructor.
Repeatable to a maximum of 9 cr. hrs.
Supervised practice in counseling individual clients of adolescent or adult age; emphasis on developing counseling skills, including counseling relationships; conceptualizing clients; self-understanding.

Supervised Practice in Group Counseling: Adolescents
W, 1 1/2-hr. cl.
Prereq.: 874, 973 or Psychol. 882, and permission of instructor.
Repeatable to a maximum of 9 cr. hrs.
Supervision of each enrollee who counsels a group of adolescents or adults in a school or other institutional setting. Kemp.

Supervised Field Experience in Counseling
A, Sp. 1 1/2-hr. cl.
Prereq.: 874, 973 or Psychol. 882, and permission of instructor.
Repeatable to a maximum of 9 cr. hrs.
Supervised practice in guidance and counseling activities in the work setting; emphasis on the range of activities performed by guidance workers in school and related settings. Guaranta and/or staff.

Group Studies in Education
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.
Advanced group studies on special problems in education.

Speech Education
Elementary Education
Experience in Urban Schools
Industrial Arts Education
Trade and Industrial Education
Business Education
Teaching of English
Teaching of Mathematics
Teaching of Science
Teaching of Social Studies
Distributive Education
Vocational-Technical Education
Student Personnel Work
Adult Education
Guidance
Higher Education
Teacher Education
History of Education and Comparative Education
Philosophy of Education
Radio and Television Education
Educational Administration
Teaching of Foreign Languages
Audio-Visual Materials of Instruction
Exceptional Children
Educational Development
Curriculum and Instruction
Educational Change
Reading

Research in Education
Research for thesis or dissertation purposes only.
Electrical Engineering

Office, 205 Electronics Laboratory, 2015 Neil Avenue

Professors Thurston (Chairman), Anderson, Ayres (Emeritus), Bacon, Bailey, Boone, Cornetet, Cowan, W. Davis, Dreese (Emeritus), Hsu, Kennaugh, Ko, Koyoumi, Kraus, Ksiezniak, Levis, Long, Mathis, McGhee, McMaster (Regent), Middleton, Peake, Peters, Richmond, Smith, Walter, Warren, Weed, Weimer (Vice Chairman), and Yovits; Associate Professors Beer and Warfield; Assistants Professors Battocletti, Collins, Compton, D. Davis, Fenton, Gettling, Higgy (Emeritus), Hodge, Ko, Koo, Lackey, Meadors, Rudderuck, Sebo, Seliga, and Swartz; Assistant Professors Breeding, Campbell, DeVore, Ehman, Erdman, Galantowicz, Garbacz, Hemami, Huff, Lawrence, Mayhan, Moffatt, Noyes, Olson, Thiele, and White; Adjunct Assistant Professors Barrick and McMillen; Instructors.

201 U 3 or 4
Introduction to lumped Circuits Analysis I
A, W, Sp. 3 or 4 cl.
Prereq.: Math. 153 and Physics 133.
R, L, C terminal relations; operational impedance; system equations; transfer function; power and energy; transient and exponential source response; phasors and sinusoids.

202 U 3 or 4
Lumped Circuits Analysis II
W, Sp. 3 or 4 cl.
Prereq.: 201.
Fourier series; poles and zeroes; Bode plots; adjustable circuits; sin (loci and magnitude curves; network theorems, current-voltage division, series-parallel reduction; operational amplifier; mutual coupling.

203 U 3 or 4
Lumped Circuits Analysis III
A, Sp. 3 or 4 cl.
Prereq.: 202.
Linear transformer; polyphase circuits; scaling; two-ports; through-access relations, analogs and duals; signal-flow and block diagrams.

207 U 2
Circuits Laboratory I
A, W, Sp. 1 cl., 1 3-hr. lab.
Concur.: 201.
Familiarization with numbers and waveforms in R, C circuits at low frequencies.

208 U 2
Circuits Laboratory II
W, Sp. 1 cl., 1 3-hr. lab.
Prereq.: 207.
Resonant and coupled circuits; black box impulse, step and exponential response; periodic non-sinusoidal waves, harmonic analysis.

209 U 2
Circuits Laboratory III
Sp. 1 cl., 1 3-hr. lab.
Prereq.: 208.
Modeling differential equations with operational amplifiers; polyphase systems; practical circuits; higher frequency models of R, L, and C non-linearities.

347 U 1
Electrical Engineering Laboratory
A, W, Sp. 3-hr. lab.
Concur.: 540.
Laboratory to accompany 540.

400 U 5
Basic Electronics
A. 3 cl., 2 2-hr. lab.
Prereq.: Math. 150, Physics 112, and permission of instructor.
Not open to students in Engineering. Introduction to circuits, devices, and instrumentation with emphasis on practical applications. Tdh.

417 (664) U 1
Electromagnetics Laboratory
A, Sp. 1 3-hr. lab.
Concur.: 512.
Transmission line parameters; attenuation, magnitude and phase of voltage and current on lines; reflected waves; waveguide characteristics and techniques; antenna patterns and impedances. Hodge.

427 U 1
Electronic Devices and Circuits Laboratory I
A, W. 1 3-hr. lab.
Concur.: 521.
Experiments involve: electron ballistics; energy levels; thermionic emission; semiconductor drift and diffusion; PN junction characteristics; vacuum-tube amplifiers and transistor characteristics; vacuum-tube amplifiers; transistor biasing. Gotting.

428 U 1
Electronic Devices and Circuits Laboratory II
W, Sp. 1 3-hr. lab.
Concur.: 522.
Measurement of transistor parameters; input and output impedances of amplifiers; field-effect transistor characteristics; integrated circuits; amplifier frequency response, difference, feedback and operational amplifiers; oscillators. Gotting.

447 U 1
Electrical Energy Conversion Laboratory I
W, Sp. 1 3-hr. lab.
Concur.: 541.
Characteristics of linear and rotary electromechanical devices, transient and steady state. Smith.

448 U 1
Electrical Energy Conversion Laboratory II
A, Sp. 1 3-hr. lab.
Prereq.: 447.
Characteristics of general magnetic networks and transformers, magnetic fields in rotating machines, Smith.

457 U 1
Signals and Systems Laboratory
A, W. 1 3-hr. lab.
Concur.: 550.
Laboratory study of signal processing, control systems and their components, operational amplifiers, and analog computers. Bacon and Hoffman.
500  (642)  U 4
Electrical Engineering
A, W, Sp.  3 cl.; 3 hr. lab.
Prereq.: Physics 133, and Math. 254.
Not open to students majoring in Elec. E. or Engr. Physicis.
Introduction to circuit analysis; circuit analysis concepts and their extension to mechanical and thermal systems by analogy; electrical instruments and measurements. Cowan and Weed.

510  (617)  U G 3 or 4
Field Theory I
A, W.  3 or 4 cl.
Prereq.: Physics 133 and Math. 416.
Vector relations, static electric fields, dielectric materials, boundary conditions, boundary value problems; field mapping, steady electric currents and their magnetic fields, and ferromagnetic materials.

511  (618)  U G 3 or 4
Field Theory II
W, Sp.  3 or 4 cl.
Prereq.: 510.
Time changing electric and magnetic fields, Maxwell's equations, relations between field and circuit theory, plane waves, Propagation vector, energy relations, polarization, antennas, and radiation.

512  (619)  U G 3 or 4
Transmission and Radiation
A, W, Sp.  3 or 4 cl.
Prereq.: 511.
General transmission theory, infinite line, terminated line, impedance transformation, rectangular waveguides, group and phase velocity, impedance of waveguides, wave propagation, and radiation by moving charges.

520  (644)  U 4
Electron Devices and Controls
A, W, Sp.  3 cl.; 3 hr. lab.
Prereq.: 520.
Theory and applications of semiconductors, transistors, photoelectric, vacuum and gas filled tubes. Study of control circuits, feedback, amplifiers, oscillators, filters, magnetic amplifiers, and instrumentation. Anderson and Weed.

521  (619)  U G 3 or 4
Electronic Devices and Circuits I
A, W.  3 or 4 cl.
Prereq.: 203; concur. 510 or equiv.
Introduction to electronics in solids and vacuum; diode, vacuum tube, and transistor characteristics; vacuum tube small-signal models; transistor biasing and thermal stabilization.

522  (619)  U G 3 or 4
Electronic Devices and Circuits II
W, Sp.  3 or 4 cl.
Prereq.: 521.
Low- and high-frequency small-signal transistor models and circuits; field-effect transistor models and circuits; integrated circuits; tuned and feedback amplifiers; oscillators.

523  U G 3 or 4
Electronic Devices and Circuits III
A, Sp.  3 or 4 cl.
Prereq.: 522.
Large signal amplifiers; pulse-signal bypass, coupling and decoupling circuits; multivibrator circuits; time base generation; photoelectric devices and applications; power supplies.

540  (643)  U 3
Electrical Engineering
A, W, Sp.  3 cl.
Prereq.: 500 or equiv.
Not open to students majoring in Elec. E. or Engr. Physics.
Electromechanical devices; an introduction to the basic principles of analysis of electromechanical devices; the approach is organized to extend the circuit concepts and dynamic analysis introduced in the preceding course. Cowan.

541  U G 4
Electrical Energy Conversion I
W, Sp.  3 cl.
Prereq.: 203; concur. 510.
Theory of magnetic circuits as applied to electromechanical energy conversion; basic rotating machines; general circuit model and matrix equations; steady state and transient characteristics.

542  U G 4
Electrical Energy Conversion II
A, Sp.  4 cl.
Prereq.: 541; concur. 550.
Generalized magnetic networks and conventional transformers; direct current, induction, and synchronous machines in the steady state; external characteristics and applications; introduction to electric power systems.

550  U G 3 or 4
Introduction to Signals and Systems
A, W.  3 or 4 cl.
Prereq.: 203.
Fourier and Laplace transforms, impulse, convolution; feedback systems, block diagrams, signal-flow graphs, stability, frequency response, pole-zero analysis, and application to computers and control.

580  (504)  U 1
Professional Aspects of Electrical Engineering
A.  1 cl.
Employment problems of graduating seniors, professional aspects of engineering and professional societies and ethics; discussion of employment practices.

601  (743)  U G 3
Communication Theory
A, W.  3 cl.
Prereq.: 523 or 522.
Theory of communication, information content, frequency spectra, noise, methods of modulation, modulators, and demodulators. W. Davis.
Electrical Laboratory
A, W. 1 cl., 1 3-hr. lab.
Concur.: 601, 623, and 660.
Laboratory in the areas of logic circuits, communication theory, and active circuits. Comtet.

Electronic Devices and Circuits IV
A, W. 3 or 4 cl.
Prereq.: 523.
Emphasis on the physical electronics necessary to understanding such devices as klystrons, magnetrons, traveling-wave tubes, parametric amplifiers, and masers.

Electron Device Physical Theory I
Su, A, Sp. 3 or 4 cl.
Prereq.: 512, 522 or 621, 623 or 630, and Engr. Mech. 510 or equiv.
Structure of the solid state; junction diode and transistor theory and models; fabrication techniques; space charge layer, field effect, photo-effect in semiconductors.

Electron Device Physical Theory II
Su, A, W. 3 or 4 cl.
Prereq.: 631.
Thermionic, thermoelectric, photo-voltaic, magnetohydodynamic energy conversion; piezoelectric, ferroelectric, and ferromagnetic devices; space-charge waves and microwave device theory.

Switching Circuit Theory
Su, A, W. 3 cl.
Prereq.: 520 or 523, or permission of instructor.
Introduction to combinational switching theory, Boolean algebra, and clocked sequential networks.

Introduction to Biomedical Engineering
A. 2 cl., 1 3-hr. lab.
Prereq.: 4th yr. Engr. or permission of instructor.
Introduction to the engineering aspects of life science utilizing lecturers from physiology, biophysics, pharmacology, medicine, and psychiatry to introduce subjects discussed in engineering terms. Weed.

Individual Studies in Electrical Engineering
Repeatable to a maximum of 18 cr. hrs.

Group Studies in Electrical Engineering
Repeatable to a maximum of 18 cr. hrs.

Advanced Circuits
W. 3 cl.
Prereq.: 523 or 621.
Introduction to network synthesis. W. Davis.

Communications Systems
Sp. 3 cl.
Prereq.: 601.
A study of the synthesis of amplitude and frequency modulated communication systems, with emphasis on transmitters and receivers. W. Davis.

Space Communications
Sp. 3 cl.
Prereq.: 601.
A study of space communication systems; long-distance transmission, wave propagation, and system considerations. D. Davis and Peake.

Communications Laboratory I
W. 1 cl., 1 3-hr. lab.
Prereq.: 523 or 62, 426 or 628, and 601.
Theory and laboratory study of non-linear amplifiers and oscillators, modulators, and detectors. D. Davis.

Communications Laboratory II
Sp. 1 cl., 1 3-hr. lab.
Prereq.: 707.
Laboratory study of communications systems. D. Davis.

Microwave Circuits
A. 3 cl.
Prereq.: 512; concur. 718 or permission of instructor.
Advanced waveguides, waveguide devices, amplifiers, generators and detection devices, special microwave techniques. D. Davis.

Radiation from Antennas
W. 3 cl.
Prereq.: 512.
Dipole, loop, aperture, reflector, lens, surface wave, and other antennas; array theory; radiation resistance, directivity, and input impedance. Kraus.

Microwave Optics
Sp. 3 cl.
Prereq.: 512 or permission of instructor.
Geometrical optics, physical optics, aperture radiation integrals, minimum range requirements, stationary phase, sidelobes, backlobes, aperture blocking, radar echo area, geometrical theory of diffraction, and gyrotropic media. Peters.
Elements of Radio Wave Propagation
W. 3 cr.
Prereq.: 512.
Practical calculations and procedures for predicting refraction and reflection by a plane or spherical earth; tropospheric, ionospheric, and scatter propagation. Levis.

Microwave Electronics
W. 3 cr.
Prereq.: 512 and 623.
Interactions between electromagnetic fields and electron beams; transit time effects, velocity modulation phenomena, and space charge waves; klystrons, magnetrons, and traveling-wave devices. Cornetet.

Radio Astronomy Instrumentation
A. 3 cr.
Prereq.: 203 or 504, 512, and 522 or 621; or Physics 632 or 656; or permission of instructor.
Theory and design of radio telescope antennas and receivers for radio astronomy and space research. Ko and Kraus.

Antenna Laboratory
W. 1 3-hr. lab.
Prereq.: 417 or 517; concur. 711.
Measurements and interpretation of antenna field patterns, impedances, gains, and current distribution. Hodge and Kraus.

Microwave Circuits Laboratory
A. 1 3-hr. lab.
Prereq.: 512, 417 or 517, and concur. 710; or permission of instructor.
Measurement of field and power distribution in wave guides, impedances, components and microwave generator properties. D. Davis and Hodge.

Circuit Theory of Solid State Devices
W, Sp.
Prereq.: 523 or 622, and 632; or equiv.

Advanced Electronic Circuits
Sp.
Prereq.: 523 or 622.
Integrating and differentiating circuits; counting circuits; timing circuits; pulse circuits; wave-forming and wave-shaping circuits. W. Davis.

Active Network and Logic Circuit Design by Digital Computer
A, Sp. 3 cr.
Prereq.: 522 or 621, and 631; or equiv.
Study of computer aided network design programs, topological matrices; active device modeling, linear and nonlinear solutions; logic circuit analysis and design by digital computer. Battocletti.

Solid State Device Laboratory
W. 1 cr., 1 3-hr. lab.
Prereq.: 428 or 628; concur. 720.
Laboratory study of solid-state devices and materials. Battocletti.

Advanced Electronic Circuits Laboratory
Sp.
Prereq.: 523 or 622, and 428 or 628; concur. 721.
Laboratory study of integrating and differentiating circuits; counting circuits; timing circuits pulse circuits; wave-forming and wave-shaping circuits. Erdman.

Quantum Electron Devices
A, Sp. 4 cr.
Prereq.: 631; and Math. 416, 512, or equiv.
Electronic energy levels in quantum electron devices; application to energy transitions in crystalline and gaseous media; applications to semiconductors, masers, and lasers. Hsu.

Parametric Electronics and Nonlinear Optics
W. 3 cr.
Prereq.: 512, and 623 or 630, or equiv.
Coupled mode theory of lumped circuit and traveling wave parametric interaction, Hamiltonian treatment of nonlinear interactions, nonlinear optics, simulated Raman and Brillouin scatterings, and phonon-phonon interactions. Hsu.

Solid State Electronics Design and Technology I
A. 3 cr.
Prereq.: 631.
Discrete and planar electronic device design and associated silicon and germanium technology; semiconductor crystal growth; liquid-solid transformations; epitaxy, oxidation, diffusion, p-n junctions, planar diodes, and transistors. Middleton.

Solid State Electronics Design and Technology II
W. 3 cr.
Prereq.: 734.
Si junction and surface FET, MOS devices; integrated active and passive device design; integrated circuit design and fabrication; photolithography; wafer processing and control testing; assembly; packaging. Middleton.

Solid State Electronics Design and Technology Laboratory
A, W, Sp. 2 3-hr. lab.
Prereq.: 631.
Repeatable to a maximum of 9 cr. hrs.
Fundamental experiments in solid state semiconductor
and energy conversion electronics; conductivity, Hall coefficient, magneto-resistance, drift mobility, diffusion; lifetime; p-n junctions; crystal growth; thermoelectric and optical properties. Middleton.

740 (790) U G 3 Electric Power Systems I
A. 3 cl.
Prereq.: 540, 542, or 642.
Representation of power systems, network equations and methods of solution, load flow, economic operation, faults—symmetrical and asymmetrical, and stability. Smith.

741 (792) U G 3 Electric Power Systems II
W. 3 cl.
Prereq.: 740.
Characteristics of circuit breakers and relays, circuit protection theory, and solution of faults. Smith.

742 (794) U G 3 Electric Power Systems III
Sp. 3 cl.
Prereq.: 512 and 740.
Transmission line and apparatus constants, traveling wave analysis, lightning and switching surge, and insulation coordination. Smith.

743 U G 3 Advanced Theory of Electrical Machines
W. 3 cl.
Prereq.: 542.
Matrix representation, steady-state and transient analysis of transformers; d-c, induction, synchronous, and special machines. Sebo.

747 (791) U G 2 High Voltage Laboratory I
A. 1 cl., 1 3-hr. lab.
Prereq.: 512, and 542 or 642.
A laboratory study of high-voltage insulation. Smith.

748 (793) U G 2 Power System Laboratory
Sp. 1 cl., 1 3-hr. lab.
Prereq.: 447 or 647, and 741.
A laboratory study of power system engineering problems. Smith.

749 U G 2 High Voltage Laboratory II
W. 1 cl., 1 3-hr. lab.
Prereq.: 747.
Laboratory study of high voltage impulse testing techniques. Smith.

751 (728) U G 3 Open Cycle Control and Instrumentation
W. 3 cl.
Prereq.: 541 or 641, and concurr. 550 or 650; or 520 and 550 with permission of instructor.
Engineering analysis and design applied to selected practical problems in the fields of sensors, measurement, signal handling, and systems as parts of overall control problems. Weed.

752 (733) U G 3 Feedback Control Systems I
W. 3 cl.
Prereq.: 642 or 642, and 550 or 650; or 540 with permission of instructor; Math. 225, 415, or 556.
Application of feedback principles to control systems, system equations; performance criteria; compensation, carrier systems, multivariable systems. Weimer.

753† (731) U G 3 Magnetic Amplifiers
Sp. 3 cl.
Prereq.: 542 or 642, and 550 or 650; or 520 and 540, with permission of instructor.

754 (738) U G 3 Feedback Control Systems II
Sp. 3 cl.
Prereq.: 752.
Practical control systems with non-ideal components; non-linear systems, state variables. Weed.

755 U G 3 Digital Control Systems
Sp. 3 cl.
Prereq.: 752.
Difference equations, z-transforms, digital filtering, sampling quantization, analog-digital conversion; block diagramming to model digital and hybrid control systems. Weimer.

757 (725) U G 2 Control Systems Laboratory I
W. 1 cl., 1 3-hr. lab.
Concur.: 751 or 752.
Experiments chosen by student interest from the course content of open cycle and instrumentation and feedback control systems.

758 (734) U G 2 Control Systems Laboratory II
Sp. 1 cl., 1 3-hr. lab.
Concur.: 733, 754, or 755.
May be taken without 757.
Experiments chosen by student interest from the course content of magnetic amplifiers, feedback control systems, and digital control systems.

760 (742) U G 3 Theory and Design of Digital Computers
W. Sp. 3 cl.
Prereq.: 660.
Number systems, introduction to computer programming, design of arithmetic and control units for general purpose digital computers, and interrelation of hardware and software system design. Breeding.

761 U G 3 Advanced Logic
W. Advanced cl.
Prereq.: 660.
State minimization, asynchronous sequential machines, the state assignment problem, transient analysis of combinational switching networks, linear sequential networks, and threshold logic. McGhee.
762  G 3  Information Theory
W.  3 cl.
Prereq.: 300 or permission of instructor.
Introduction to information theory: codes, sources, and
transmission over noisy channels.  D. Davis and Lackey.

767  (723)  G 2  Digital Computer Laboratory
Sp.  1 cl., 1 3-hr. lab.
Concur.: 760.
Laboratory study of counting, arithmetic, and digital
circuits. Olson.

770  G 3  Biological Control Systems
W.  2 cl., 1 3-hr. lab.
Prereq.: 550, 650, or equiv.
Application of electrical engineering to the analysis of
biological control systems such as visual, muscular,
thermal, and cardiovascular; receptor, nerve axon, and
muscle transfer characteristics. Weed.

771  G 3  Bio-Medical Instrumentation
Sp.  2 cl., 1 3-hr. lab.
Prereq.: 770.
Application of electrical engineering to instrumentation,
monitoring, and signal and data handling in bio-electrical measurements; consideration of
implants, heart pacers, electrocardiograms and
electroencephalographs, and speech analysis.
Campbell and Weed.

772  G 3  Advanced Bio-Medical Instrumentation
A.  2 cl., 1 3-hr. lab.
Prereq.: 771.
Classroom and laboratory investigation of some of
the advanced instrumentation problems in EEG, EKG,
catheter measurements, spectral analysis, correlation,
cell potential, and ion evaluation. Campbell and Weed.

783  G 1-18  Individual Studies in Electrical Engineering
Repeatable to a maximum of 18 cr. hrs.

794  G 1-18  Group Studies in Electrical Engineering
Repeatable to a maximum of 18 cr. hrs.

800  (815)  G 3  Transients in Linear Systems
Su, A, W.  3 cl.
Prereq.: 521 or 620.
Writing system equations for electrical, mechanical,
and mixed systems with lumped parameters; use of
Fourier, Laplace, and Z-transform methods. Wiemer.

801  G 3  State Variable Methods in Linear Systems
A, W.  3 cl.
Prereq.: 800.
Elements of linear transformation and matrix theory;
state equations and vectors; differential time-invariant
and time-variable systems; discrete systems;
observability and Lyapunov stability. Hemami.

802  (830)  G 3  Network Synthesis I
Sp.  3 cl.
Prereq.: 800 and Math. 552.
Modern theory of network synthesis with applications
to advanced design of filters, equalizers, and
compensators. W. Davis and Warren.

803  (831)  G 3  Network Synthesis II
A.  3 cl.
Prereq.: 802.
Continuation of 802. W. Davis and Warren.

804  (827)  G 3  Communication Theory I
A, W.  3 cl.
Prereq.: 504, 550, or permission of instructor.
The application of Fourier series and Fourier integral
methods of the design and analysis of communication
circuits and signals. W. Davis and Warren.

805  (828)  G 3  Communication Theory II
W, Sp.  3 cl.
Prereq.: 804 and Math. 502.
The application of statistical methods to problems in
communication systems including signal representation,
multiplexing, detection, and filtering. W. Davis and Warren.

806  G 3  Communication Theory III
Sp.  3 cl.
Prereq.: 805.
Topics selected from the communication applications of
statistical decision-theory, signal representation,
optimal filtering, and other matters of current interest.
Warren.

808  (860)  G 3  Theory and Analysis of Magnetic Amplifiers
W.  3 cl.
Prereq.: 523 or 622, and 800; or equiv.
Theory of magnetic materials; steady state and
transient analysis of core elements and the
related critical factors; power gain; resistive, inductive,
and capacitive load. Weed.

809  (861)  G 3  Analysis of Magnetic Amplifiers
Memory Devices and Components
Sp.  3 cl.
Prereq.: 808 and 650; or equiv.
The analysis of magnetic amplifiers with extrinsic and
intrinsic feedbacks; a-c, d-c, or combination control;
switching properties; and applications. Weed.
Fundamentals of Electromagnetic Theory
Su, A, W, 3 cr.
Prereq.: 512 or equiv.
Solution of Maxwell's equations by scalar, vector, and
Hertzian potentials; plane waves in dielectric,
conducting, and anisotropic media; polarization,
boundary value problems, radiation, and scattering.
Kouyoumjian and Kraus.

Waveguides and Resonators
W, 3 cr.
Prereq.: 810.
General theory of waveguides, modes, discontinuities,
layers, cavities, and power considerations. Peake.

Theory of Microwave Components
Sp, 3 cr.
Prereq.: 811.
General circuit theory of one port and multiports;
impedance and scattering concepts; reciprocity in
microwave circuits; impedance transformations;
directional devices; non-reciprocal devices; and
non-linear elements. Peake.

Radiation and Radiating Systems
Sp, 3 cr.
Prereq.: 810.
Radiation theory: dipole, linear, loop, helical, biconical,
and aperture antennas; beam shaping; aperture
distribution, self and mutual impedance, microwave
optics; radio telescope, antenna temperature. Kraus.

Advanced Antenna Theory I
Su, 3 cr.
Prereq.: 810.
Field theorems; boundary-value problems; solution of
the integral equations for scattering problems;
radiation integrals; far-field criteria; antenna theorems;
mathematical and numerical techniques. Richmond.

Advanced Antenna Theory II
A, 3 cr.
Prereq.: 810 or equiv.
Analysis and synthesis of linear and planar radiating
systems; excitation and propagation of surface and
leaky waves; modulated traveling-wave structures;
backward-wave antennas. Walter.

Propagation of Electromagnetic Waves
Sp, 3 cr.
Prereq.: 713 and 810.
Advanced study of transmission and reception of radio
waves in the presence of the earth and its atmosphere;
tropospheric, ionospheric, and scatter propagation.
Levis.

Advanced Electromagnetic Theory I
A, 3 cr.
Prereq.: 810 or equiv.
Representation of fields by vector wave functions and
dyadic Green's functions; Huygen's principle for
electromagnetic waves; application to antenna and
scattering problems. Kouyoumjian.

Advanced Electromagnetic Theory II
W, 3 cr.
Prereq.: 817.
Asymptotic methods and the geometrical theory of
diffraction; integral equations and variational methods;
propagation through inhomogeneous media and
anisotropic media; surface waves. Kouyoumjian.

Advanced Electromagnetic Theory III
Sp, 3 cr.
Prereq.: 817.
Application of saddle-point methods to electromagnetic
problems; Fock theory for currents on curved surfaces;
application of variational and perturbation techniques
to electromagnetic problems. Kouyoumjian.

Methods of Analysis of Interaction
Between Electrons and Fields
A, Sp, 3 cr.
Prereq.: 631 and 810 or permission of instructor.
Electron beams; energy transfer; induced current;
space charge waves; traveling and backward wave
interactions; coupled-mode analysis; cross-field
interactions. Cornetet.

Theory of Electron Guns and Electron Beams
W, 3 cr.
Prereq.: 631 and 810 or permission of instructor.
Electron optical principles; effect of thermal velocities;
effect of space charge; electron guns; periodic focusing.
Cornetet.

Plasma Dynamics
W, 3 cr.
Prereq.: 631, 810, or equiv.
Motion of ions and electrons, ionization processes,
electromagnetic phenomena in plasma, electron beams
in plasma. Ko and Peters.

Solid State Electron Devices I
A, 3 cr.
Prereq.: 631, 732 or equiv.; Math, 512 or equiv.
Physical properties of solids, crystal symmetry, lattice
vibrations, electrons in a periodic lattice; the effective
mass theorem. Swartz.
Solid State Electron Devices II
W. 3 cl.
Prereq.: 830; concur. Physics 705.
Irreversible thermodynamics and the Onsager relation; the Boltzmann transport equation, lattice and impurity scattering, conductivity and related phenomena; optical properties of semiconductors. Swartz.

Solid State Electron Devices III
Sp. 3 cl.
Prereq.: 831.
Semiconductors and metals in strong electric and magnetic fields; theory of negative resistance devices, microwave devices, and related topics. Swartz.

Theory of Semiconductor Junction Devices I
A. 3 cl.
Prereq.: 631.
Low and high level injection in p-n junctions; recombination statistics; the bipolar transistor, static and switching characteristics, low and high frequency equivalent circuits, and thermal effects. Boone and Swartz.

Quantum Electron Devices
A. 3 cl.
Prereq.: 722 and 810.
Analysis of energy of atomic gases as applied to gas lasers; crystal structure of solid-state maser and laser materials.

Quantum Electron Devices
W. 3 cl.
Prereq.: 834.
Quantum mechanical and statistical analysis of energy levels in solids and of microwave and optical energy conversions in masers and lasers.

Quantum Electron Devices
Sp. 3 cl.
Prereq.: 835.
Theory and design of masers and lasers; current research in quantum electron devices.

Dielectric and Magnetic Electronics
W. 3 cl.
Prereq.: 630 and 732, or equiv.
Application of dielectric and magnetic effects to electron devices; dipoles; local fields; electromechanical interactions; spontaneous polarization, domain structure, and switching, Gattling.

Semi-Insulator Electronics
Sp. 3 cl.
Prereq.: 630 and 732, or equiv.
Conduction effects in low conductivity materials applied in electron devices; space-charge limited currents; tunneling devices; Schottky barrier effects; thin film electronics, Gattling.

Theory of Semiconductor Junction Devices II
W. 3 cl.
Prereq.: 832.
Continuation of 831; theory of the unipolar transistor, the MOS capacitor and transistor. Boone and Swartz.

Electromechanical Systems
A. 3 cl.
Prereq. or concur.: 800.
Application of the methods of electric circuit analysis to mechanical, acoustical, electromechanical, and electroacoustical systems. Cowan.

Electric Power Systems Analysis
A. 3 cl.
Concur.: 800.
Analysis of faults, load flow, and transient stability of electric power systems by advanced mathematical techniques. Smith.

Economic Operation and Control of Electric Power Systems
W. 3 cl.
Concur.: 801.
Principles of economic operation and control of isolated or interconnected electric power systems, including effects of power losses in transmission lines. Smith.

High Voltage Direct Current Power Transmission
Sp. 3 cl.
Prereq.: 842.
Principles of insulation and protection, control of power flow, variable requirements, commutation, and harmonic reduction. Smith.

Theory and Design of Feedback Control Systems
W. 3 cl.
Prereq.: 550 or 650, and 800; or permission of instructor.
Linear feedback theory, signal-flow graphs, return difference, stability studies with parameter variation, independent control of transmission and sensitivity functions, multi-variable systems, and approximation methods. Weimer.

Synthesis of Linear Feedback Control Systems
Sp. 3 cl.
Prereq.: 850.
Sampled-data systems, the Z-transform, digital compensation; synthesis of systems with statistical inputs and constraints; advanced topics. Weimer.

Analysis of Non-Linear Systems
A. 3 cl.
Prereq.: 800 and concur. 801.
An advanced study of non-linear systems and methods of analysis; stability studies with Lyapunov functions and functional analysis; applications from electric circuits and control systems. Weimer.
Modern Control Theory I
Prereq.: 801.
Optimal control by dynamic programming, Pontryagin's maximum principle, and variational methods; minimum time, energy, and fuel problems for linear continuous and discrete systems. Fenton and Hemami.

Modern Control Theory II
Sp. 3 cl.
Prereq.: 854.
Computational methods in optimal control, quasi-linearization, and invariant imbedding; estimation and filtering for continuous and discrete linear systems; introduction to stochastic system optimization. Fenton and Hemami.

Information Science I
W. 3 cl.
Prereq.: 660 or permission of instructor.
Pattern recognition methods including feature extraction, spatial filtering, correlation, and transform techniques, image manipulation including input-output methods, contrast enhancement, feature enhancement, and geometrical manipulation. Lackey.

Advanced Coding Theory I
A. 3 cl.
Prereq.: 660 or permission of instructor.
The coding problem; linear codes and their implementation; cyclic codes. Lackey.

Advanced Coding Theory II
W. 3 cl.
Prereq.: 863.
Special codes including Bose-Chaudhuri and Fire codes; burst error correction; recurrent codes checking arithmetic operations; new developments in coding theory. Lackey.

Advanced Sequential Logic
A. 3 cl.
Prereq.: 660 or permission of instruction.
Conversion from machine description to circuit description; simplification techniques based upon lattices, and matrix and group treatment; machine isomorphisms, homomorphisms, and regular expressions. Warfield.

Radio Astronomy Theory I
(See under Astron. 862.)

Radio Astronomy Theory II
(See under Astron. 863.)

Biological System Modeling I
A. 2 cl., 1 3-hr. lab.
Prereq.: 770, 800, and Physiol. 601.

Consideration of current literature in the area of biological system modeling; cardio-vascular, water regulation, and visual tracking and light control; laboratory implementation of models. Weed.

Biological System Modeling II
W. 2 cl., 1 3-hr. lab.
Prereq.: 870.
Continuation of 870 covering such systems as thermoregulation, skeletal-muscle system, and neurons. Weed.

Biomedical Systems Modeling and Cybernetics
Sp. 3 cl.
Prereq.: 550 or equiv., and Physiol. 602.
An engineering analysis of modern methods of mathematical and computer modeling of living control systems; analog, digital, and hybrid computer methods. Weed.

Advanced Studies in Electrical Engineering
Repeatable to a maximum of 18 cr. hrs.

Seminar in Electrical Engineering
Prereq.: Permission of instructor.
Repeatable to a maximum of 18 cr. hrs.
a. Research Topics in Electromagnetics.
   Sp. Kennaugh and Richmond.
   Sp. Thurston.
c. Information Theory.
   A, W. Saltzer.
d. Nonlinear Quantum Electronics.
   Sp. Hsu.
e. Recent Developments in Quantum Electronics.
f. Electrodynamics of Moving Media.
   W. Kouyoumjian.
g. Electromagnetic Theory of Optical Devices.
h. Radar Systems.
i. Advanced Space Communications.
   A. Ksieniski.
j. Switching Theory and Logical Design.
k. Solid State Electronics Technology.
   A, W. Middleton.

Interdepartmental Seminar in Radio Astronomy
(See under Interdepartmental Seminars.)

Interdepartmental Seminar
(See under Interdepartmental Seminars.)
Engineering Graphics

Office: 240 Hitchcock Hall, 270 Neil Avenue

Professors Yarrington (Chairman), Field (Emeritus), Hang, Kearns, Pfaffenbeger (Emeritus), Parkinson, Shupe, and Watkins; Associate Professors LaRue, Reed, and Romeo; Assistant Professors Baldwin, Denning, Devaneaux, and Smith.

100 (400) U 4
Elementary Engineering Drawing
A, W, Sp. 4-2 hr. cl. and lab.
Use of instruments, projection drawing, auxiliary views, sections, size descriptions, and pictorial drawing. Baldwin.

102 (402) U 4
Principles of Engineering Drawing
W, Sp. 4-2 hr. cl. and lab.
Prereq.: 100 or permission of instructor.
Not open to students with credit for 111 or (440). Orthographic projection; selected elements of descriptive geometry as theoretical bases for the graphical solution of technical problems and the development of other systems of projection; slide rules. Romeo.

110 U 4
General Engineering Graphics
Su, A, W, Sp. 4-2 hr. cl. and lab.
Prereq. or concur.: Math. 150.
Not open to students with credit for 112 or (442). Graphic language of engineering and its application to the analysis, development, representation, and communication of engineering concepts. Watkins.

121 U 3
Graphic Presentation I
W. 3-2 hr. cl. and lab.
Representation of three-dimensional subjects by precise graphics; orthographic and pictorial, shades and shadows. Parkinson.

122 U 3
Graphic Presentation II
Sp. 3-2 hr. cl. and lab.
Prereq.: 121.
Continuation of 121; intersections and developments, size description, fastenings, engineering drawings, and graphic technology. Reed.

H190 U 4
General Engineering Graphics
A. 4-2 hr. cl. and lab.
Prereq.: Honors admission to College of Engineering.
Graphic language of engineering and its application to the analysis, development, representation, and communication of engineering concepts; intensified coverage of selected topics.

194 U 1-5
Special Problems in Engineering Graphics
Prereq.: Permission of instructor.
Selected problems of an experimental nature stressing the systematic approach to engineering graphics problems and embracing appropriate modes of attack.

200 U 3
Computer Utilization with Introduction to Engineering Analysis
Su, A, W, Sp. 3 cl. and lab. hr.
Prereq. or concur.: Math. 150.
Digital computer applications to engineering analysis; processing a program in an algebraic language utilizing the facilities of the Computer Center. Kearns.

204 (504) U 4
Technical Drawing
A. 4-2 hr. cl. and lab.
Prereq.: 102, 110, 112, 190, or (442).
Commercial drawing practice; size specification, tolerance, and fits; technical sketching and layout of machine parts and assemblies; drawing symbols and schematic diagrams; drafting room procedures. Watkins.

206 (506) U 4
Structural Drawing
W. 4-2 hr. cl. and lab.
Prereq.: 112, 204, or (442).
Introduction to structural drafting; steel and frame structures; riveted, bolted, and welded connections; terminology and erection requirements. Denning.

208* (508) U 4
Production Illustration
Sp. 4-2 hr. cl. and lab.
Prereq.: 206 or permission of instructor.
Commercial and industrial applications of pictorial representation; instrument drafting techniques, rendering, templates, automated drafting, and reproduction methods. Baldwin.

237† (537) U 5
Graphic Presentation
A. 5-2 hr. cl. and lab.
Representation of three-dimensional subjects by precise graphics; orthographic and pictorial; shades and shadows. Parkinson.
Engineering Mechanics

Office: 209 Boyd Laboratory, 155 West Woodruff Avenue

Professors West (Chairman), Folk (Emeritus), Graham, Korda, Leissa, Ott (Emeritus), and Powell (Emeritus); Associate Professors Clausen, Graff, Popelar, Stevens, Tucker (Emeritus), and Wu; Assistant Professors Fu, Kennedy, Segerlind, and Yu.

201 (511) U 5
Applied Mechanics
W. 4 cl., 2 1-hr. lab.
Prereq.: Math. 151.
Statics of force systems by analytical and graphical methods; centroids and moment of inertia; stresses and strains of structural members; combined stresses by Mohr’s circle; columns; deflections and statically indeterminate beams by area moments.

202 (512) U 5
Applied Mechanics
Sp. 4 cl., 2 1-hr. lab.
Prereq.: 201.
Continuation of 201.

210 (521) U 4
Statics
Su, A, W, Sp. 3 cl., 2 1-hr. lab.
Prereq.: Physics 131; or concur. Math. 254.
Resultant and equilibrium of coplanar and noncoplanar force systems; trusses, frames, and connected bodies; friction; centroids and moment of inertia of masses and areas.

215 U 5
Statics and Strength of Materials
A, W, Sp. 5 cl.
Prereq.: Physics 131; or concur. Math. 254.
Resultant and equilibrium of isolated and connected body force systems; introduction to response of deformable bodies to action of axial, and bending and torsional loads.

410 (607) U 4
Dynamics
A, W, Sp. 3 cl., 2 1-hr. lab.
Not open to students with credit for 510.
Linear and angular motion from constant and variable forces; connected bodies; impulses; momentum; energy.

420 (602) U 4
Strength of Materials
Su, A, W, Sp. 3 cl., 2 1-hr. lab.
H420 (honors) may be available to students enrolled in a college honors program.
Normal and shearing stress and strain; energy; torsion; flexural stress; beam deflections; combined stress; theories of failure; columns.

427 U 1
Strength of Materials Laboratory
A. Sp. 1 2-hr. lab.
Prereq. or concur.: 420.
Experimental study of response of deformable bodies to loads using mechanical and electrical gauges and methods of photoelasticity.

510 (617) U G 4
Dynamics
Su, A. Sp. 3 cl., 2 1-hr. lab.
H510 (honors) may be available to students enrolled in a college honors program.
Prereq.: 420 or concur. Math. 255 or 556.
Dynamics of particles and rigid bodies; impulses, momentum, work, and energy; three dimensional vector acceleration; conservative systems; single degree of freedom vibration analysis.

521 (605) U G 3
Stress Analysis I
W. 3 cl.
Prereq.: 420.
Statically indeterminate and variable section beams by area moments; bending of non-symmetrical section; energy of bending and shear; beam limit design; torsion of open and closed non-circular sections.

522 (606) U G 3
Stress Analysis II
A. 3 cl.
Prereq.: 420.
Failure theories; Mohr’s circle for strain rosettes; thick cylinders; non-circular torsion; curved beams; Castigliano’s theorem.

621† (712) U G 3
Advanced Strength of Materials
W. 3 cl.
Prereq.: 420; or concur. Math. 512 or 557.
Beams on elastic foundations; beam columns; deflection curves by trigonometric series; limitations of superposition; suspension systems; large deflections; rings loaded perpendicular to their plane.

624† (716) U G 3
Elastic Energy Theory
A. 3 cl.
Prereq.: 521 and one of: Civil E. 530, 632, Aero-Astro. E. 710.
Deformation and stress in frames, beams, bents, rings, arches, and columns; redundant beams and frames; combined direct and torsional stresses; shear deformations.
627  (800)  UG 3
Experimental Methods in Mechanics
A, Sp.  2 cl., 2 lab. hrs.
Prereq.: 420.
Static and dynamic strain analysis by electrical gages; grid techniques; brittle coatings; analogies; reflective photoelasticity in normal and oblique incidence; motion measurements.

660  UG 5
Fluid Dynamics
A.  5 cl.
Prereq.: 410 and Math. 514.
Basic equations and concepts of fluid flow; two and three dimensional inviscid flow problems; conformal transformations; vortex motion; viscous flow; boundary layer effects; compressible flow.

694  (800)  UG 2-5
Group Studies in Engineering Mechanics
Prereq.: 13 cr. hrs. of 400-level courses in Engr. Mech. and permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
The student must register for specific problems in the areas indicated below, and may register for more than one at a time.
  a. Experimental Stress Analysis.
  b. Dynamics.
  c. Fluid Mechanics.
  d. Applied Elasticity.
  e. Strength of Materials.
  f. Vibrations.
  g. Plasticity.
  h. Plates and Shells.
  i. Continuous Media.

700  (700)  UG 3
Methods of Engineering Analysis
A.  3 cl.
Prereq.: 70 or hrs. 700-level courses in Engr. Mech. and Math. 512.
Comprehensive study of techniques and devices for solving equations arising in engineering mechanics.

711  (715)  UG 3
Advanced Engineering Dynamics
W.  3 cl.
Prereq.: 410 and Math. 255 or 556.
Three-dimensional vector statics, kinematics and kinetics of particles and rigid bodies; energy, momentum, and stability; application of Lagrange's equations to machinery, vehicles, and ballistics; gyroscope.

731  (707)  UG 3
Vibrations of Discrete Systems
A.  3 cl.
Prereq.: 410 and Math. 255 or 556.
Free and forced vibrations of mechanical systems having lumped mass and elasticity; normal coordinates; dissipative system; stability; simple engineering applications.

732  (800)  UG 3
Non-Linear Vibrations
Sp.  3 cl.
Prereq.: 731 and Math. 522 or equiv.
Vibrations of damped and undamped systems with non-linear restoring forces; self-sustained oscillations; application of Hill's equation of stability of non-linear oscillations.

740  UG 3
Applied Elasticity I
A.  3 cl.
Prereq.: 420, and Math. 512 or equiv.
Classical problems in elasticity; St-Venant torsion and bending theory; plane problems in rectangular and polar coordinates; axisymmetric problems; thermoelasticity.

741  UG 3
Applied Elasticity II
W.  3 cl.
A continuation of 740.

748  (704)  UG 3
Photoelasticity
W.  2 cl., 2 lab. hrs.
Prereq.: 420.
Stress analysis using polarized light techniques; polariscope optics; photoelastic materials and models; two and three dimensional problems; dynamics; photoelasticity, photoplasticity, and thermal studies.

751  (715)  UG 3
Theory of Elastic Stability
A.  3 cl.
Prereq.: 521 or 522, and Math. 255 or 556.
Buckling of struts, rings, arches, and plates; torsional instability; stability criteria, exact and approximate methods.

752  (718)  UG 3
Theory of Dynamic Stability
Sp.  3 cl.
Prereq.: 731.
Study of the criteria for dynamic stability; methods of stabilizing critical systems; applications to space mechanics, structures, and vehicles.

754  (725)  UG 3
Theory of Thin Elastic Plates
W.  3 cl.
Prereq.: 521 and Math. 255 or 556.
Derivation of the basic equations; classical solutions for rectangular and polar coordinates; approximate methods.

757†  (727)  UG 3
Elements of Inertial Guidance and Navigation
Sp.  3 cl.
Prereq.: 711.
Moment of momentum of rigid bodies; perturbing torques in the angular equations of motion of a rigid body; gyrodyamics; accelerometers; inertial platforms and surface and subsurface navigation systems; control systems dynamics; a survey of modern mathematical techniques in the study of dynamical systems.
811*  (817)  G 3
Analytical Dynamics
Sp.  3 cl.
Prereq.: 711.
Lagrange's equations of motion for particles and rigid bodies; impulse; small oscillations; non-holonomic and dissipative systems; Hamiltonian systems; applications to intricate engineering problems.

812  (830)  G 3
Energy Principles in Mechanics
A.  3 cl.
Prereq.: 521 or 522 or 624, and Math. 255.
Theoretical development of energy principles in mechanics; strain energy and complementary energy with related minimal principles; applications to problems in elasticity, dynamics, and vibrations.

831  (807)  G 3
Vibrations of Continuous Systems
W.  3 cl.
Prereq.: 731; or prereq. or concur. Math. 512 or 557.
Equations of motions for strings, membranes, prismatical bars, and plates for various boundary conditions; approximate methods for complicated shapes; wave propagation in elastic media.

832  G 3
Vibrations Laboratory
Sp.  2-3 hr. lab.
Prereq.: 831.
Experiments in vibrations of discrete systems, beams, plates, and shells; propagation of stress waves; material properties by dynamic measurements.

833  G 3
Elastic Wave Propagation
Sp.  3 cl.
Prereq.: 740 and 831.
Dispersion and group velocity; waves in extended media; propagation and reflection in half space; Lamb problem; waves in plates and rods by exact theory; scattering of waves.

835*  (827)  G 3
Random Vibrations
A.  3 cl.
Prereq.: 831.
Description of random processes; statistical properties of the response of mechanical systems; optimization of systems subjected to random inputs; instrumentation.

840†  (735)  G 3
Theory of Continuous Media
A.  3 cl.
Prereq.: 740.
Equilibrium, compatibility, and strain displacement relationships for a general continuum; constitutive equations for problems of elasticity, fluid dynamics, and inelasticity.

843  (840)  G 3
Advanced Elasticity
A.  3 cl.
Prereq.: 741.
Complex variable methods; anisotropic elasticity; three-dimensional elasticity; mixed boundary value problems; thermoelasticity.

847  (820)  G 3
Theory of Plasticity
Sp.  3 cl.
Prereq.: 740 and Math. 512.
Plastic range stress-strain relations; elasto-plastic behavior of beams, and trusses; torsion of prismatic bars; plane strain; shear lines; limit analysis.

854  (824)  G 3
Plates and Shallow Shells
Sp.  3 cl.
Prereq.: 754.
Advanced methods for the analysis of bending in thin, elastic plates having arbitrary shapes, loading, and boundary conditions; bending theory of shallow shells, and problem solutions.

855  (825)  G 3
Theory of Thin Elastic Shells
W.  3 cl.
Prereq.: 754.
Differential geometry of surface; general equations for an arbitrary shell; membrane theory; shells of revolution.

860*  (810)  G 3
Classical Hydrodynamics
Sp.  3 cl.
Prereq.: 711; Math. 512, 513, and 514, or equiv.
Basic equations and concepts of inviscid fluid flow, solutions to two- and three-dimensional problems; conformal transformations; approximate methods.

864  G 3
Theory of Viscoelasticity
W.  3 cl.
Prereq.: 740.
Basic concepts of time dependent inelastic behavior; viscoelastic constitutive laws; correspondence principles; quasi-static and dynamic problems.

881  (801)  G 2-5
Advanced Theoretical Mechanics
Prereq.: 410, 521, (610), and Math. 556 or equiv., and evidence of sufficient background in area of study chosen, and permission of chairman.
Repeatable to a maximum of 15 cr. hrs.
The student must register for specific subject in the areas indicated below and may register for more than one at a time.
b. Advanced Dynamics.
d. Applied Elasticity.
e. Strength of Materials
f. Vibrations.
g. Plasticity.
h. Plates and Shells.
i. Continuous Media.
Seminar in Engineering Mechanics
W, Sp. 1 cr.
Repeatable to a maximum of 6 cr. hrs.
Lectures and discussions covering a wide range of topics, presented by staff, graduate students, and guest speakers.

Research in Engineering Mechanics
Research for thesis or dissertation purposes only.

ENGLISH COMPOSITION
No prerequisite except as established by testing and course sequence.

Composition and Reading
Not open to students with credit for 301.
Training in the fundamentals of expository writing, as illustrated in the student's own writing and in the essays of professional writers. Corbett, Director.

Composition and Reading
Prereq.: 101.
Not open to students with credit for 103 or 301.
Continued training in expository writing with emphasis on the logical elements in exposition. Corbett, Director.

Composition and Reading
Prereq.: 102.
Not open to students with credit for 103, H195, or 301.
Continued training in expository writing, approached specifically through the study of imaginative literature. Corbett, Director.

Composition and Reading
A.
Prereq.: EM credit for 101.
Not open to students with credit for 103 or 301.
Designed for proficiency students only, as a substitute for 102.
Training in expository writing, with emphasis on the logical elements in exposition. Corbett, Director.

Composition and Reading
W.
Prereq.: 104 or EM credit for 102.
Not open to students with credit for 103, H195, or 301.
Continued training in expository writing, approached specifically through the study of imaginative literature. Corbett, Director.

Freshman Honors Seminar
W, Sp. 3 cr.
Prereq.: 102 or 104; cumulative point-hour ratio of 3.0 or better, with 3.5 or better in Eng. and permission of dept.
Not open to students with credit for 103 or 105; may be substituted for 103 or 105.
Studies in thematically related literary works; discussion and guided writing on basic questions about the nature of literature; topic varies quarterly. Muste, Director.
GENERAL PREREQUISITES FOR COURSES
NUMBERED 200
Unless otherwise indicated, the prerequisites for
200-level courses are English 103, 105, or H195.

220 (550) U 5
Introduction to Shakespeare
Not open to students with credit for 262. Students
majoring in Engl. in College of Humanities should elect
520 instead of 220.
Intensive study of selected plays of Shakespeare
designed to give an understanding of drama as
theatrical art and as an interpretation of fundamental
human experience. Soelner, Director.

260 (520) U 5
Introduction to Poetry
Designed to help students understand and appreciate
poetry through intensive study of a representative
group of poems. Wheeler, Director.

261 (521) U 5
Introduction to Fiction
Intensive study of a number of short stories and
ovels to acquaint the general student with some of
the important themes and techniques of fiction. Beja,
Director.

262 (555) U 5
Introduction to Drama
A, W.
Not open to students with credit for 220.
A critical analysis of selected dramatic masterpieces
from Greek antiquity to the present, designed to clarify
the nature and major achievements of western
dramatic art.

265 (507) U 5
Narrative Writing
Prereq.: Permission of instructor.
Guided practice in the writing of short fiction.
Canzonieri, Director.

266 (508) U 5
Verse Writing
Sp.
Prereq.: Permission of instructor.
The techniques of writing verse; students will write in
various forms and meters and study the works of
established poets as models.

280 (529) U 5
The English Bible
A, W.
A study of the King James version of the Bible with
respect to literary questions, historical development,
and religious concepts.

281 U 5
Introduction to Negro Literature in America
Su, A, W, Sp. 4-5 cl.
Prereq.: 103 or equiv.

Examination of important works of fiction, drama, and
poetry about the Negro in American life, with emphasis
on works by Negro authors.

290 (510) U 5
Masterpieces of American Literature
Not open to students with credit for 511, 531, 552, 553.
A critical study of some major American writers chosen
from among the following: Poe, Hawthorne, Emerson,
Thoreau, Melville, Whitman, Dickinson, Twain, James,
Frost, Eliot, Faulkner, and Hemingway. Muste, Director.

293 (563) U 5
Masterpieces of English Literature
Introduction to medieval and renaissance narrative
poetry, beginning with Beowulf and including major
works of Chaucer, Spenser, and Milton. Cox, Director.

294 (564) U 5
Masterpieces of English Literature
The neo-classical and romantic periods; major works
by such authors as Pope, Swift, Dryden, Johnson,
Wordsworth, Coleridge, and Keats. Swetnam, Director.

295 U 5
Masterpieces of English Literature
Su, A, W, Sp. 5 cl.
Not open to students with credit for 290.
The Victorian and early modern periods with major
works by such authors as Tennyson, Browning, Arnold,
Shaw, Conrad, Lawrence, Joyce, and Yeats. Kincaid,
Director.

H286 U 5
Sophomore Honors Seminar
A. 5 cl.
Prereq.: Cumulative point-hour ratio of 3.0 or better,
with 3.5 or better in Engl., and permission of
department.
Studies in the relationship of works of literature to
their general intellectual contexts, including such
topics as Deism, Marxism, Primitivism, Freudian
psychology; topic varies quarterly. Muste, Director.

H299 U 5
English Honors Pro-seminar
Sp. 5 cl.
Prereq.: Cumulative point-hour ratio of 3.0 or better,
with 3.5 or better in Engl., and permission of
department.
An introduction to the materials and methods of
literary study through intensive reading in one major
English or American author; topic varies quarterly.
Muste, Director.

301 (505) U 5
Informative Writing
Prereq.: 3rd yr. standing and 103 or equiv.
Not open to students with credit for 262.
Intensive advanced training in the art of informative
writing. Passe, Director.
302 (506) U 5
Critical Writing
Prereq.: 103 or equiv., 3rd yr. standing. Engl. majors only.
Not open to students with credit for 301.
Intensive practice in writing various kinds of analyses of literary tests. Eder, Director.

305 (519) U 3
Technical Writing
A, W, Sp. 2 cl., 1 hr. conf.
Prereq.: 3rd yr. standing in the B.S. curricula.
Training in practical writing for industry, business, and research, with emphasis on the special requirements and techniques for the professional report. Blickle, Director.

GENERAL PREREQUISITES FOR COURSES NUMBERED 500
These courses may provide graduate credit only in departments other than English. Prerequisites: 15 hrs. of courses in English on the 200 level, or 10 hrs. in English and 10 in specified allied departments.

513 (654) U G 5
Introduction to Medieval Literature
A, Sp.
The study of masterpieces from the Middle Ages, chosen for their values in interpreting medieval culture as well as for their independent literary worth.

520 (676) U G 5
Shakespeare
A critical consideration of the art, personality, and achievement of Shakespeare in the light of Renaissance and modern significance.

521 (674) U G 5
The English Renaissance
A, Sp.
Not open to students with credit for 522.
A study of Tudor prose and poetry as they exemplify literary art and as they reflect the creative and inquiring temper of the age.

522 (671) U G 5
Early 17th Century Literature
W, Sp.
A study of the poetry and prose of 1600-1660, excluding the major works of Milton.

530 (615) U G 5
Milton
A, W. 5 cl.
A study of the major poetry and prose, with emphasis on Paradise Lost, Paradise Regained, and Samson Agonistes.

531 (635) U G 5
The Age of Wit and Satire
W.
The skeptical mind of the Early Enlightenment as shown in lyric and satiric verse, essays, and drama, from Dryden to Pope.

535 (636) U G 5
Literature of the 18th Century
A, Sp.
The ideas and artistry of the Age of Reason as reflected in the work of major figures: Swift, Pope, Fielding, Sterne, Boswell, Johnson, and Blake.

540 (641) U G 5
Romantic Poetry
English literary and intellectual romanticism as seen in the poetry of Wordsworth, Coleridge, Byron, Shelley, and Keats, and selected critical documents of the period.

541 (642) U G 5
Victorian Poetry
Su, A, W.
Readings in the poetry of Tennyson, Browning, Arnold, Swinburne, Rossetti, Meredith, Hopkins, and Hardy, as seen against the background of Victorian ideas and literary taste.

542 (656) U G 5
The 19th Century English Novel
Su, W, Sp.
Not open to students with credit for 641.
Readings in a group of major novelists, such as Austen, Dickens, Thackeray, and others, with special emphasis upon social and humanistic values.

551 (609) U G 5
The American Renaissance in Literature
A, W.
The readings of this course do not duplicate those of 521.
An introduction to the major American writers of the mid-19th century; Poe, Hawthorne, Melville, Emerson, Thoreau, and Whitman.

552 (610) U G 5
American Literature, 1865-1914
Studies in fiction and poetry emphasizing such major figures as Twain, Howells, James, Dickinson, Robinson, Crane, Dreiser, and Willa Cather.

553 (615) U G 5
20th Century American Writers
A study of the development of American literature after World War I, with emphasis on the major poets and novelists.

565† (643) U G 5
The Writing Laboratory
W. 3 cl., conf.
Prereq.: Permission of instructor.
Detailed analysis in conference and class discussion of work presented by students; six novels are discussed as types in modern writing.

570 (625) U G 5
English Style and Usage
Variety in style and use in written and spoken English.
H590  U 5
Junior Honors Seminar
A, Sp.  5 cl.
Prereq.: Cumulative qv-point-hour ratio of 3.0 or better, with a 3.5 or better in English and, permission of dept.
Intensive study of one of the major periods of English and American literature; periods vary quarterly.

H590.01 The Middle Ages
H590.02 The Renaissance
H590.03 Neo-Classicism
H590.04 Romanticism
H590.05 The Later 19th Century
H590.06 The Modern Period

GENERAL PREREQUISITES FOR COURSES NUMBERED 600
These courses may provide graduate credit in all departments. Prerequisites: 30 hrs. of courses in English on the 500 level, or 10 hrs. in English and 10 hrs. on the 300-500 level in specified allied departments.

615  (653)  U  G  5
Introduction to Chaucer
Su, A, Sp.
A close study of Troilus and Criseyde and The Canterbury Tales as introduction to the artist and his period.

624  (677)  U  G  5
English Drama: Medieval and Renaissance
Su, W.
Prereq.: 220, 262, or equiv.
A study of English popular drama from its origin to 1542, with special emphasis upon the evolution of dramatic concepts and theatrical art.

634  (678)  U  G  5
English Drama: Restoration and 18th Century
Sp.
Prereq.: 220, 262, or equiv.
A study of English drama from 1660 to 1800; Restoration heroic drama and wit comedy, 18th century sentimental drama, the comedy of Goldsmith and Sheridan.

642  (640)  U  G  5
19th Century Prose
Sp.
Selections from the principal romantic and Victorian non-fictional prose writers, read both as literary art and as documents of contemporary thought.

643  (614)  U  G  5
20th Century British Writers
A study of the development of British literature from the end of the 19th century to the present, with emphasis on the major poets and novelists.

649  (670)  U  G  5
Modern Drama
W.
An historical and critical examination of the major developments, personalities, and achievements in the drama of Europe and America since the advent of Ibsen.

665  (616)  U  G  5
A Writer's Approach to Fiction
A.
Prereq.: 265 or equiv. or permission of instructor.
The writing and analysis of fiction; although the emphasis is upon student writing, there will be reading and discussion of the works of contemporary writers.

667†  (648)  U  G  5
Playwriting
Sp.
Prereq. or concur.: One of the following: 52C, 624, or 649.
Elementary laboratory course in playwriting; methods of play analysis with attention to dramatic technique; an historical consideration of the major forms of drama.

669  U  G  5
Applied English Phonology
W.  5 cl.
A study of English phonology and its application to a variety of literary and non-literary resources.

670  (620)  U  G  5
Folklore
A, Sp.
A critical examination of some of the outstanding English and American folksongs and international folk tales; lectures and class discussions will be supplemented by recordings.

671  (626)  U  G  5
Introduction to English Grammar
A.
A study of various systems of English grammar, with emphasis on their application to writing and teaching.

672  (627)  U  G  5
Introduction to the History of English
Su, A, W.
A study of the historical development of the English language, with emphasis on its outer history, and on the history of words and sentences.

676  (621)  U  G  5
History of Literary Criticism
W.
Intensive study of the basic texts in literary criticism from Plato to T. S. Eliot.

680†  (689)  U  G  5
Literary and Cultural Heritage of the Middle East
W.
An introduction to Assyro-Babylonian, Arabic, and Persian literature in their historical and cultural settings.

683  (701)  U  G  1-5
Individual Studies in English
Prereq.: Senior standing and permission of Dept. Grad. Committee.
Students may register for individual directed study under this number for work not normally offered in courses.
H695  U  5
Senior Honors Seminar
W.  5 cl.
Prereq.: Cumulative point-hour ratio of 3.0 or better,
with a 3.5 or better in Eng. and permission of dept.
Selected problems (themes, movements, genres, and
styles) emphasizing continuity and development in
English and American literary and linguistics history;
topic varies quarterly.

H696  U  2-5
Honors Essay
Prereq.: Cumulative point-hour ratio of 3.0 or better,
with a 3.5 or better in Eng. and permission of dept.
Repeatable to a maximum of 5 cr. hrs.
Required of all honors candidates.
Independent research and writing under the guidance
of an instructor chosen by the student.

699  (690)  U  5
Senior Seminar and Tutorial
Prereq.: Engl. majors in their last qtr.
A reading course designed to unify the student's
knowledge of English and American literature and to
clarify his understanding of problems of interpretation
and criticism. Shapiro, Director.

777  U  G  3
Teaching of English to Speakers
of Other Languages I
W.  3 cl.
Prereq.: 672, Ling. 600, 601; concur. Speech 777.
An examination of the theories and approaches to
second language teaching, with emphasis upon
specific problems in teaching written English.

778  U  G  3
Teaching of English to Speakers
of Other Languages II
Sp.  3 cl.
Prereq.: 777, Speech 777; concur. Speech 778.
A continuation of 777.

H783† (705)  U  G  3-5
Honors Course
Prereq.: 4th yr. standing; the record of a in at least
half his Eng. courses and an average of B in all of
his courses; the permission of professor under whose
supervision the work is to be completed.
Open only to candidates for distinction in Eng. who
have in their junior year completed with high grades
a program approved by the Committee on Honors.
Repeatable to a maximum of 15 cr. hrs.
A program of reading arranged for each student, with
individual conferences, reports, and honors thesis.
Griswold, Director.

GENERAL PREREQUISITES FOR COURSES
- NUMERATED 800
Prerequisites: 30 hrs. of courses in English or 20 hrs. in
English and 25 hrs. in specified allied disciplines.

800  G  2
Introduction to Graduate Study
A.  2 cl.
Open only to M.A. candidates.
Required of all M.A. candidates.
An introduction to the methods and tools of graduate
study in English and American literature.

810* (749)  G  5
Introduction to Old English Language
and Literature
A, W.  5 cl.
The reading of Old English prose with special attention
to the language and to cultural background.

812* (754)  G  5
Beowulf
Su, W.
Prereq.: 811 or equiv.
A close study of the text of Beowulf and its
background.

813* (746)  G  5
Middle English
Sp.
Prereq.: 810 or permission of instructor.
A study concentrating on 12th to 14th century English
language and literature.

814* (747)  G  5
Studies in Early English Literature
W.
Prereq.: Either 615, 810, 813, or equiv.
A detailed and critical study of a medieval author or
topic, exclusive of Chaucer.

815* (757)  G  5
Studies in Chaucer
Sp.
A critical study of some aspect of Chaucer's work in
depth.

818  G  5
The Middle Ages
W.  3 cl.
Credit does not apply to the minimum hours required
after the master's degree for the Ph.D.
A lecture-survey of Late Middle English literature
concentrating on the period 1300-1500.

820 (776)  G  5
Shakespeare
A, Sp.
An intensive consideration of selected problems in the
scholarly study of Shakespeare.

821* (772)  G  5
Studies in Renaissance Prose
A.
The evolution of literary prose from More to Milton as
seen in representative works which are related
critically to rhetorical theory and significant cultural
forces.
Studies in Renaissance and Early 17th Century Poetry
A.
A close study of significant verse of late 16th and early 17th centuries.

Spenser
W.
A study of Spenser's poetry, its literary significance and its relation to foreign, classical, and native English poetic traditions.

Studies in Renaissance Drama
Sp. 5 cl.
A critical study of significant trends in English drama between 1500 and 1642, excluding Shakespeare.

The Renaissance
Su. 3 cl.
Credit does not apply to the minimum hours required after the Master's degree for the Ph.D.
A lecture-survey of English literature, 1500-1660.

Milton
Su, W.
A critical study of the poetry and prose of John Milton, viewed against his social and literary background.

Dryden
W.
A detailed study of the poems, plays, and essays of John Dryden, as exemplifying the principles and practices of the Early Enlightenment.

Swift
W.
An intensive critical study of Swift's work and its relation to the intellectual and political movements of the Age of Reason.

Pope
A.
Pope's poems considered formally and as representative documents of his age.

Studies in the 18th Century
Su.
Intensive work in an important aspect of 18th century literature or thought.

The Restoration and 18th Century
Sp. 3 cl.
A lecture-survey of English literature between 1660-1798.

Studies in Romantic Poetry and Poetics
Su, W.
Literary romanticism, as represented by one or more of the poets (Blake, Coleridge, Wordsworth, Byron, Shelley, and Keats), in relation to contemporary intellectual and political movements; topic varies year to year.

Studies in Victorian Poetry
A.
The artistic values of the poetry, its place in the romantic tradition, its reflection of the contemporary intellectual and social milieu; topic varies each year.

Studies in 19th Century Prose
A.
Selected non-fictional prose, read as examples of literary art and as documents of the age's religious, political, social, and aesthetic thought; topic varies from year to year.

Studies in the 19th Century English Novel
Su, W. Sp. 5 cl.
Intensive study of some aspect of the novel in the period from Jane Austen to Thomas Hardy; topic varies from year to year.

The 19th Century
W. 3 cl.
Credit does not apply to the minimum hours required after the master's degree for the Ph.D.

20th Century Poetry
A, Sp.
Prereq.: Acquaintance with the major poets studied in 553 and 652 is assumed.
An intensive study of a representative body of modern poetry, with emphasis on several major poets of England and America.

Studies in 20th Century Fiction
Su, W.
Prereq.: Acquaintance with modern continental novelists is recommended.
Tendencies in modern fiction as seen in the works of such major figures as Proust, Joyce, Mann, D. H. Lawrence, Virginia Woolf, Hemingway, and Faulkner.
851 (708) G 5
Studies in the American Renaissance
A. Sp.
Prereq.: 551 or equiv.
An intensive study of several authors drawn from the following list: Cooper, Poe, Hawthorne, Melville, Emerson, Thoreau, and Whitman.

852 (709) G 5
Studies in American Literature, 1865-1914
W.
Prereq.: 552 or equiv.
An intensive study of several major authors of the period, including Twain and James.

853 G 5
Studies in Individual American Writers, 1800-1900
W, Sp. 4 cr.
An intensive study of the works of a single major American author of the 19th century; author varies yearly.

856 G 5
American Literature
A. 3 cr.
Credit does not apply to the minimum hours required after the master's degree for the Ph.D.
A lecture-survey of American literature between 1800 and 1900.

865 (717) G 5
The Writing of Fiction
A.
Prereq.: Submission of a manuscript to instructor before enrollment; 265 and 665 are recommended.
For those who have already demonstrated some proficiency in the writing of fiction.

871† (702) G 3
Principles and Methods of Linguistic Analysis
Su.
Prereq.: Permission of director.
The study of the principal methods of the analysis of the English language.

872 (703) G 3
Structural Analysis of English Expository Prose
A.
Prereq.: Permission of director.

873 (704) G 3
Principles and Methods of Literary Analysis
W.
Prereq.: Permission of director.
Principles and methods of the study of English poetry, drama, and prose fiction.

876 (710) G 5
Studies in Critical Theory
A.
A review of theory and practice in some of the principal forms of literary analysis.

877* (755) G 5
Advanced English Grammar
W.
Prereq.: Grad. standing and one of the following: 669, 671, 672, Ling. 500, 601, Speech 852, or equiv.
An advanced approach to the grammar and the grammars of English and their application to teaching and writing.

878* (756) G 5
History of the English Language
Sp.
Prereq.: Grad. standing, and one of the following: 669, 671, 672, Ling. 500, 601, Speech 852, or equiv.
An advanced approach to the history of English, with emphasis on inner history as well as its outer matrix, and its place among the world's languages.

880 (715) G 5
Studies in English or American Literature
Prereq.: Permission of Dept. Grad. Committee Chairman.
Offered occasionally as an intensive course on some phase of English or American literature.

GENERAL PREREQUISITES FOR COURSES NUMBERED 900
Prerequisites: 15 hrs. of English on the 800 level.

910T† (852) G 5
Studies in the Medieval Period
W, Sp.
Individual research in a major aspect of Old and Middle English literature.

911† (853) G 5
Studies in the Medieval Period
Su.
Prereq.: 910.
Continuation of 910.

912† (854) G 5
Research in Chaucer
W.
Individual research in various aspects of medieval literature, with Chaucer as center.

913† (855) G 5
Research in Chaucer
Sp. 5 cr.
Prereq.: 912.
A continuation of 912.

920T† (877) G 5
The English Renaissance
W.
Reading and research in non-dramatic literature of the English Renaissance; topics may vary from year to year.

921† (878) G 5
The English Renaissance
Sp.
Prereq.: 920.
A continuation of 920.
Studies in the Age of Shakespeare
Su.
Exploration of the problems, materials, and methods relevant to a scholarly study of Shakespeare's work and cultural environment, culminating in individual research.

Research in the Restoration Period
A.
Individual research in Restoration literature, Dryden to Pope; oral and written reports.

Research in the Restoration Period
W.
Prereq.: 933.
Continuation of 933.

Studies in 18th Century Literature
W.
Prereq.: 935.
Continuation of 935.

Studies in 18th Century Literature
Sp.
Prereq.: 930.
Bibliography and Method
A.
For advanced graduate student in the methods and tools of literary research.

Textual Criticism and Editing
W.
Prereq.: 980.
Evaluation of literary editorial methods, past and present; training in skills requisite to the textual critic and scholarly editor; practice in textual editing.

Individual Studies in English
Repeatability:
Doctoral students may register for individual study in areas not normally covered by courses.

Research in English: Thesis
Preparation for the master's comprehensive examination, and research for the thesis.

Research in English: Dissertation
Research for dissertation purposes only.

Entomology

Office: 103 Botany and Zoology Building, 1735 Neil Avenue

Professors Coleman, Borror, Briggs, Britt, Davidson, Fisk, Hildsworth, Knulle, Rings, Rothenbuhler, Sleezmann, Stephen, Treece, Triplehorn, Veeard, Weaver, and Wharton; Associate Professors Barry, Blair, Johnston, R. L. Miller, Niemczyk, Shambaugh, Stairs, and Waldron; Assistant Professors Collins, Hink, Lindquist, Knove, Musick, Nault, and Still.

General Entomology
A. W, Sp. 1 cl., 2 3-hr. lab.
Prereq.: Biol. 100 or Zool. 101, or equiv.
The biology and habits of insects, the use of insects in scientific research, and the interrelations of beneficial and harmful species with man. Johnston, Stairs, and Triplehorn. Fee.

Apiculture
Sp. 3 cl., 2 2-hr. labs.
The principles of management of honeybees in the production of honey, wax, package-bees, and queens and in pollinating crops of economic importance. Stephen.
460  (551)  U 5
Economic Entomology
A, W, Sp.  5 cl.
Prereq.: Biol. 200 and Zool. 201, or equiv.
A basic course dealing with the economic aspects;
analyzing and solving of common insect problems.
Davidson and Holdsworth.

500  (650)  U G 5
Entomology for Biology Majors
Su.  3 cl., 2 2-hr. labs.
Not open to students with credit for 200.
The biology, morphology, metamorphosis and habits of
insects, methods of collecting, preserving, culturing
and identifying the important families.  Fee.

561  (566)  U 3
Horticultural Entomology
Sp.  3 cl.
Prereq.: 460 and 10 additional cr. hrs. 200 level or above
in Entom. or Hort.
A detailed study of insects and mites attacking
horticultural crops. Davidson.

602  (608)  U G 3
Biology of the Honey Bee
Sp.  3 cl.
Prereq.: 200, Biol. 630 or equiv.
The behavior, social organization, morphology,
physiology, reproduction, diseases, and genetics of
the honey bee studied from a comparative and
evolutionary viewpoint. Rothenbuhler.

611  (670)  U G 4
Field Entomology
Su (1st Term). 3 all-day cl.
Given only at the Franz Theodore Stone Laboratory.
Deal primarily with collecting, identification, and field
methods; field trips are made to various islands of
Lake Erie and the mainland.

612  (671)  U G 4 or 5
Aquatic Entomology
Sp.
a. Su. (4 cr. hrs.) Given only at Franz Theodore Stone
Laboratory. 3 all-day cl.
b. Sp. (5 cr. hrs.) Given only on Columbus campus.
4 2-hr. cl.
Prereq.: 200 or 611 or equiv.
Designed for preparation in the teaching of biology
or for research on aquatic resources; taxonomy and
ecology of immature and adult aquatic insects are

621  (651)  U G 5
External Morphology of Insects
A.  2 cl., 6 hrs. lab.
Prereq.: 200 or equiv.
A study of the comparative external morphology of
insects with special emphasis on evolutionary trends
and on taxonomic application or morphology. Borror.
Fee.

631  (600)  U G 5
Insect Physiology
A.  3 cl., 2 2-hr. labs.
Prereq.: 460 or equiv. and Chem. 291, 292 or equiv.
The general physiology of insects and other
arthropods; the laboratory will stress the use of
insects to demonstrate fundamental physiological

660  (640)  U G 5
Advanced Economic Entomology
A.  3 cl., 2 2-hr. labs.
Prereq.: 460 and Plant Path. 401 or equiv.
The principles of insect control; field and laboratory
studies will be made of major insect control problems.
Davidson. Fee.

661  (655)  U G 5
Medical Entomology
Sp.  3 cl., 2 2-hr. labs.
Prereq.: Microbiol. 607 or Zool. 610 or equiv.
A consideration of the recognition characteristics,
biology, and control of insects and other arthropods of
importance to the health of man, livestock, and
wildlife. Venard. Fee.

662  (653)  U G 5
Principles of Insect Toxicology
W.  3 cl., 2 2-hr. labs.
Prereq.: 631 or equiv. or permission of instructor.
Physiochemical properties and physiological action of
insecticides, miticides and adjuvants; methods of
securing and evaluating toxicological data are stressed.
Collins. Fee.

670  U G 4
General Acarology
Su.  1 cl., 4-hr. lab.
An introduction to the morphology, development, and
general biology of mites; laboratory consists of a
Fee.

693  (701)  U 2-5  G 2-10
Individual Studies
Prereq.: Permission of instructor.
(For topics given under this number see listings in the
Biological Sciences section of the Arts and Sciences
catalog.)
Individual work in the field of the chosen problems.

694  (701)  U G 2-5
Group Studies
Prereq.: Permission of instructor.
(For topics given under this number see listings in the
Biological Sciences section of the Arts and Sciences
catalog.)
Group work in the field of the chosen problems.
741 U G 5
Insect Pathology
Sp. 3 cl., 2 2-hr. labs.
Prereq.: Microbiol. 607 or equiv.
Diseases of insects, both infectious and non-infectious, and the resulting pathologies; the epizootiology of diseases and use of microorganisms for insect population management. Hink. Fee.

751* (705) U G 5
Systematic Entomology
W. 2 cl., 6 lab. hr.
Prereq.: 621.
A survey of all orders except Diptera, Lepidoptera, and Hymenoptera, with emphasis on the determination of insects to family and beyond; collecting and preserving insects. Borror. Fee.

752†* (706) U G 5
Systematic Entomology
W. 2 cl., 6 lab. hrs.
Prereq.: 621.
Continuation of 751, covering the Diptera, Lepidoptera, and Hymenoptera. Borror. Fee.

753* (712) U G 5
Immature Insects
A. 1 cl., 4 2-hr. lab.
Prereq.: 751 and 752 or equiv. and permission of instructor.
A survey of immature stages of insects with emphasis on the anatomy and taxonomy of holometabolous larvae. Valentine and Holdsworth. Fee.

802†* (816) G 5
Research Methods: Living Insects
Sp. 3 cl., 2 2-hr. labs.
Prereq.: Permission of instructor.
Current field and laboratory research methods of trapping, sampling, handling, and rearing insects; conducting life history studies; and measuring environment factors. Fisk. Fee.

821* (817) G 5
Internal Morphology of Insects
Sp. 2 cl., 3 2-hr. labs.
Prereq.: 621.
Current field and laboratory research methods of trapping, sampling, handling, and rearing insects; conducting life history studies; and measuring environment factors. Fisk. Fee.

831 (850) G 5
Advanced Insect Physiology
W. 2 cl., 3 3-hr. labs.
Prereq.: 631 or Zool. 430, or equiv.
Topics include insect integument, water balance, excretion, digestion, nutrition, respiration, growth and metamorphosis; the project type laboratory provides experience in techniques of insect physiology. Fisk. Fee.

841 (814) G 5
Biological Control
W. 3 cl., 2 2-hr. lab.
Prereq.: Permission of instructor.

870†* G 4
Medical-Veterinary Acarology
Su. 1 cl., 4-hr. lab.
3 hrs. cl.-lab daily (Su. 3 wks.).
The mites associated with man, domestic animals, and wildlife, stressing their ecology and behavior in relation to transmission of viral, rickettsial, bacterial, and protozoan diseases. Johnston. Fee.

871* G 4
Agricultural Acarology
Su. 1 cl., 4-hr. lab.
3 hrs. cl.-lab. daily (Su. 3 wks.).
An intensive review of the mites associated with crops, ornamental plants, and stored food products with emphasis on taxonomy and ecology of these animals. Johnston. Fee.

896 G 1-3
Interdepartmental Seminar in Polar and Alpine Studies
Sp.
(See under Interdepartmental Seminars.)

897 G 1
Interdepartmental Seminar in Natural Resources
(See under Interdepartmental Seminars.)

999 (950) G Arr.
Research in Entomology
Research for thesis and dissertation purposes only.

Forestry
(SCHOOL OF NATURAL RESOURCES)

Office: 140 Horticulture, Forestry and Food Technology Center, 2001 Fyffe Court

Professors Gatherum (Chairman), Cowen, Kriebel, and Touse; Associate Professors Larson, Vimmerstedt, and Whittemore; Assistant Professors Thielges and Vogt.

GENERAL PREREQUISITES FOR COURSES NUMBERED 200
Unless otherwise indicated, the prerequisites for 200-level courses are 45 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-199.

221 (409) U 5
Coniferous Dendrology
A. 3 cl., 2 2-hr. labs.
Prereq.: Bot. 102.
A study of the principal species of Gymnosperms in the United States with emphasis on identification, range, and silvical characteristics. Cowen and Thielges.
222 (408) U 5
Hardwood Dendrology
Sp. 3 cl., 2 2-hr. labs.
Prereqs.: Bot. 102.
A study of the principal species of Angiospermae in the
United States with emphasis on identification, range,
and silvical characteristics. Cowen and Thielges.

223 (502) U 5
Silvics
W. 5 cl.
Prereqs.: Bot. 102.
The effect of site factors on forest vegetation and
action of forest cover on the site; characteristics of
individual trees and forest stands. Gatherum, Larson,
Vinnerstedt, and Vogt.

GENERAL PREREQUISITES FOR COURSES
NUMBERED 300 AND 400
Unless otherwise indicated, the prerequisites for 300-
and 400-level courses are 90 cr. hrs. in collegiate
courses, exclusive of ROTC and Phys. Ed.; or specified
course(s) numbered 100-399.

310 (410) U 5
Principles of Forestry
A. 3 cl., 2 2-hr. lab.
History of American forests, their character and
occurrence; underlying fundamentals of silviculture
and forest management; introduction to forest
management and protection. Touse.

321 (421) U 5
Silviculture
A. 5 cl.
Prereqs.: 221, 222, and 223.
A study of the methods of handling the forest on a
permanent basis to assure the reproduction and proper

323 (423) U 5
Forest Mensuration
W. 5 cl.
Prereqs.: 221, 222, and 223.
The measurement of the forest and forest products.

325 (425) U 5
Forest Management
Sp. 5 cl.
Prereqs.: 321 and 323.
A study of the practical problems of managing
woodland property, both from the technical and the
financial standpoint. Fee.

431 U 5
Wood Structure and Properties
A. 5 cl.
Prereqs.: 221 and 222.
The classification and identification of the important
timber species based upon wood structure and
properties; defects in wood; moisture relationships;
physical and chemical properties. Touse and Whitmore.

432 U 5
Manufacturing Forest Products
W. 5 cl.
An intensive study of the manufacturing industries
based on wood products or products derived from wood
by chemical and other means. Touse. Fee.

433 U 5
Analysis of Forest Industry Management
Sp. 5 cl.
Prereqs.: 431 and 432.
A survey of the common problems encountered by
managers of the wood-using industries; emphasis on
sources of information and methods of solution. Touse.

GENERAL PREREQUISITES FOR COURSES
NUMBERED 500 AND 600
Unless otherwise indicated, the prerequisites for 500-
and 600-level courses are 15 cr. hrs. in courses in the same
discipline numbered 200 or higher, or 10 cr. hrs. in
courses numbered 200 or higher in the same discipline,
plus 10 cr. hrs. in courses numbered 200 or higher in
specified allied disciplines; or baccalaureate degree.

593 (701) U G 2-5
Individual Studies
Prereq.: Permission of instructor.
H593 (honors) may be available to students enrolled
in a college honors program or eligible for enrollment.
Special problems in the field of forestry and forest
products.

GENERAL PREREQUISITES FOR COURSES
NUMBERED 900 AND 900
Unless otherwise indicated, the prerequisites for 800-
and 900-level courses are 30 cr. hrs. in courses in the same
discipline, or 20 cr. hrs. in the same discipline,
plus 25 cr. hrs. in specified allied disciplines.

999 (950) G Arr.
Research in Forestry
Research for thesis and dissertation purposes only.

French
Office: 248 Dieter Cunz Hall of Languages, 1841 Millikin
Road
Professors Bulatkin (Chairman), Carlut, Davidson,
Demorest (Emeritus), Havens (Emeritus), Kellem,
Meiden, and Pimsleur; Associate Professors Astier and
Cotrell; Assistant Professors Ames, Honeycutt, and
Williams; Instructors DeZelar, Immen, and Rodriguez.

101 (401) U 5
Elementary French
Su, A, W, Sp. 5 cl.
May not be taken concur. with Span. 101-102, Port.
Not open to students who are not eligible to take
Engl. 101. Credit in 101 will be counted toward
graduation only if followed by successful completion of
102 or if taken after successful completion of the
fourth regular university course in another foreign
language.
Elements of French grammar, with oral and written
exercises; attention to ear training and oral practice;
elementary reading based on French geography,
history, and customs.
102 (402) U 5
Elementary French
Su, A, W, Sp.  5 cl.
Prereq.: 101.
May not be taken concur. with Span. 101-102, Port. 101-102, Ital. 101-102.
The elements of French grammar with abundant oral
and written exercises; development of conversational
skill; reading, vocabulary building, attention to French
idioms.

103 (403) U 5
Intermediate French
Su, A, W, Sp.  5 cl.
Prereq.: 102.
Course conducted in French.
Review of salient points of elementary grammar,
attention to French idioms; reading of short stories,
plays, and novels.

104 (404) U 5
Intermediate French
Su, A, W, Sp.  5 cl.
Prereq.: 103 or 112.
Course conducted in French.
Reading in French plays, short stories, and novels;
emphasis on oral practice and French idioms.

105 (410) U 5
Elementary French Conversation and Composition
Su, A, W, Sp.  5 cl.
Prereq.: 101.
Course conducted in French.
Intensive practice in oral and written French, based
on texts and periodicals concerned with French life
of today; grammar and idiom review.

112 U 5, 10, 15
Intensive French
Su.  15 cl. Enrollment limited to 25 students.
Prereq.: Permission of chairman.
Full time of student and full fees required. Equiv.
of 101, 102, 103. Students with credit for 101 or the
equiv. may not register for more than 10 cr. hrs.
Students with credit for 101 and 102 or the equiv.
may not register for more than 5 cr. hrs. Students with
credit for 102 or the equiv. may not register for credit.
Elementary and intermediate French; intensive drill in
form, syntax, vocabulary, and idiom; reading of short
stories and plays in French.

162 (415) U 5
Elementary Intermediate French
for Selected Students
W.  5 cl.
Prereq.: Grade of A in 101 and permission of dept.
Successful completion of 101-102-163 fulfills language
requirements and satisfies prereq. for 400-level courses.

163 (416) U 5
Elementary Intermediate French
for Selected Students
Sp.  5 cl.
Prereq.: 162.
Successful completion of 101-102-163 fulfills language
requirements and satisfies prereq. for 400-level courses.

271 (570) U 3
French Classics in Translation: The Middle Ages
to the Mid-Eighteenth Century
Su.  A.  3 cl.
Not open to French majors.
Reading, analysis, and discussion of major French
works in translation, beginning with the Song of
Roland and continuing with authors such as Montaigne,
Pascal, Moliere, Voltaire, Rousseau.

272 U 3
French Literature in Translation
Su, W.  3 cl.
Not open to French majors.
Readings of the late 18th and 19th centuries;
treatment of the Confessions of Rousseau, novels by
Balzac, Stendhal, and Flaubert.

273 U 3
Modern French Literature in Translation
Su, Sp.  3 cl.
Not open to French majors.
Discussion of readings in English of 20th century
French masterpieces; treatment of the French novelists
and dramatists, Proust, Gide, Malraux, Sarrie, and
Camus.

401 (518) U 3
Review Grammar and Composition
Su, A, W, Sp.  3 cl.
Prereq.: 101.
Review of French grammar; composition or assigned
topics and practice in translation.

402 (521) U 3
Intermediate French Conversation
and Composition
A, Sp.  3 cl.
Prereq.: 105.
Vocabulary building, practice in speaking French,
conversation, and composition dealing with social and
economic aspects of French life.

403 (522) U 3
Intermediate French Conversation
and Composition
Su, W.  3 cl.
Prereq.: 105.
Vocabulary building, practice in speaking French,
conversation, and composition dealing with intellectual
and artistic aspects of French life.

404 (532) U 5
French Pronunciation
Su, A, W, Sp.  5 cl.
Prereq.: 105.
Not open to students with credit for (632).
Formation of French sounds, rules of pronunciation
and diction; lectures and practical exercises; use of
phonetic symbols.
421 (517) U 5
Introduction to Modern French Literature
Su, A, W, Sp. 5 cl.
Prereq.: 104.
Not open to students with credit for (417).
Rapid reading and discussion of French literary movements and masterpieces of the 19th century and their relation to modern France.

422 (529) U 5
Masterpieces of French Literature: Middle Ages and Renaissance
A, W, Sp. 5 cl.
Prereq.: 421.

423 (530) U 5
Masterpieces of French Literature: 17th and 18th Centuries
A, W, Sp. 5 cl.
Prereq.: 421.

441* (535) U 5
La civilisation française des origines a nos jours.
A. 5 cl.
Prereq.: 401, 402, or 403.
Major developments of French culture from 1900.
Carlit.

571 (405) G 5
Basic French for Graduate Students
Su, A, W, Sp. 5 cl.
Prereq.: Graduate standing.
Credit does not apply to the minimum number of hours required for the master's or doctoral degrees. No audit.

572 G 3
French for Research I
Su, A, W, Sp. 3 cl.
Prereq.: Grade of C or above in 571, or equiv.
Satisfactory completion of this course (grade of A or B) will be accepted as evidence of a dictionary reading knowledge in fulfillment of Ph.D. language requirement.

573 G 3
French for Research II
Su, A, W, Sp. 3 cl.
Prereq.: Grade of A or B in 572, or equiv.
Satisfactory completion of this course (grade of A or B) will be accepted as evidence of a thorough reading knowledge in fulfillment of Ph.D. language requirement.

601 (628) U G 5
Modern French Syntax
Su, A, W, Sp. 5 cl.
Prereq.: 401.
Systematic review of French grammar with composition and other exercises, based on contemporary authors, modern tendencies in syntactic analysis. Meiden.

602 (619) U G 3
French Translating
A, W, Sp. 3 cl.
Prereq.: 601 or equiv.
Translations from French to English and English to French.

603 (638) U G 3
Advanced Spoken and Written French
Su, Sp. 3 cl.
Prereq.: 402, 403, and 601 or equiv.
Intensive practice in speaking and writing French, based on contemporary usage.

604 (642) U G 3
Advanced French Pronunciation and Phonostylistics
Su, W. 2 cl. 1 lab hr.
Prereq.: 404 or permission of instructor.
Training in auditory and oral aspects of French pronunciation; special emphasis on analysis of different types of spoken French.

621† (616) U G 5
French Literature of the Renaissance
A. 5 cl.
Prereq.: 421 and either 422 or 423.
Selections from Marot, Rabelais, the Pliade and Montaigne as they reflect the age of humanism and illustrate the transition from medieval to modern forms and ideas. Cotrell.

622 (617) U G 5
French Classicism, 1600-1715
A. 5 cl.
Prereq.: 421 and either 422 or 423.
The formation of the classic spirit; the perfection of dramatic form and the 17th century portrait of man. Williams.

623 (618) U G 5
French Literature of the Enlightenment
W. 5 cl.
Prereq.: 421 and either 422 or 423.
A study of the ideas of the eighteenth century in their relation to modern times; special emphasis on Montesquieu, Voltaire, Diderot, and Rousseau. Williams.

624 (603) U G 5
The Romantic Period in French Literature, 1800-1850
A. 5 cl.
Prereq.: 421 and either 422 or 423.
The development of romanticism and rise of realism in the first half of the 19th century in the novel, poetry, and drama. Carlit.
625 (604) U G 5
French Literary Currents 1850-1914
Sp. 5 cl.
Prereq.: 421 and either 422 or 423.
Realism, naturalism, symbolism, and the movements of reaction in the novel and in literary criticism. Caruit and Cotrell.

626 (640) U G 5
Contemporary French Literature
Sp. 5 cl.
Prereq.: 421 and either 422 or 423.
20th century literary currents, and their significance, with special attention given to the novel; Proust, Gide, Malraux, Mauriac, Bernanos, Saint-Exupery, Camus, Sartre, and others. Ames.

627 (634) U G 3
Contemporary French Drama
A. 3 cl.
Prereq.: 421 and either 422 or 423.
Plays of Lenormand, Romains, Claudel, Giraudoix, Cocteau, Montherlant, Anouilh, Sartre, Camus, and Ionesco; the different theatres and directors from Copeau to the present day. Ames and Astier.

628 (651) U G 3
Modern French Poetry
W. 3 cl.
Prereq.: 421 and either 422 or 423.
Source and processes of poetic creations as exemplified in selected works of French poets from Baudelaire to the present time. Astier.

629 (639) U G 3
Exégèse de textes
Su, W. 3 cl.
Prereq.: 421 and either 422 or 423.
Repeatable to a maximum of 6 cr. hrs.
Intensive linguistic and literary exploration of representative passages from modern French authors.

631 (645) U G 2-5
French Literature
Su. 3 cl.
Prereq.: 421 and either 422 or 423.
Repeatable to a maximum of 15 cr. hrs.

641 (636) U G 3
La civilisation française contemporaine
Su. 3 cl.
Prereq.: 401 and 402 or 403.
Course conducted in French. Life, institutions, and culture of contemporary France.

684 U G 1-15
Group Studies in French
Prereq.: Permission of instructor.
Repeatable to a maximum of 30 cr. hrs.

702 U G 3
Advanced Translation and Comparative Stylistics
A, Sp. 3 cl.
Prereq.: 608 or permission of instructor.
A comparative study, through intensive translation, of the stylistic resources of French and English. Astier.

H783 (705) U 3-5
Honors Course in French
Prereq.: 4th yr. standing with a grade of A in at least half of the French courses and an average of B in the remainder, and permission of dept. and the Honors Committee of the College.
Repeatable to a maximum of 15 cr. hrs.
Others undergraduates with special aptitudes a greater opportunity to do independent study than is possible in the ordinary course; work in conference, library, or phonetics laboratory.

811 (729) G 3
History of the French Language: Introduction
W. 3 cl.
Prereq.: M. A. Candidates in French; others by permission of instructor.
Basic concepts of historical linguistics; the major factors of change in the history of the French language from Roman times to the present.

812 (801) G 3
History of the French Language: Phonology
A. 3 cl.
Prereq.: Knowledge of Latin.
The evolution of sounds from Latin to Modern French.
Keller.

813 (802) G 5
History of the French Language: Morphology
W. 5 cl.
Prereq.: 812.
The evolution of grammatical forms from Latin to Modern French. Kellerm.

821 (813) G 3
Old French Literature
Sp. 3 cl.
Main currents of Old French Literature to 1300; reading of the Chanson de Roland; Yvain of Chrétien de Troyes, Beroul’s Tristan, representative lyrics. Bulatkin.

822 (805) G 3
Middle French Literature
Sp. 3 cl.
Prereq.: 821.
Survey from about 1300 and 1365; Machaut, Froissart, Deschamps, Christine de Pisan, Charles D’Orléans, Villon, Anglo-French literary relations, with special reference to Chaucer. Kellem.

824 (717) G 3
Topics and Problems in 17th Century French Literature
A. 3 cl.
Prereq.: 622 or permission of instructor.
Intensive exploration of a special topic or problem, with readings in literary works and in relevant criticism and scholarship. Davidson and Williams.
825* (718) G 3  
**Topic and Problems in 19th Century French Literature**  
A. 3 cl.  
Prereq.: 623 or permission of instructor.  
Intensive exploration of a special topic or problem, with readings in literary works and in relevant criticism and scholarship. Mitchell.

826 (719) G 3  
**Topics and Problems in 19th Century French Literature**  
Sp. 3 cl.  
Prereq.: 624, 625, or permission of instructor.  
Intensive exploration of special topics or problems with readings in literature works in relevant criticism and scholarship. Carlut.  
Topic to be announced.

827 (720) G 3  
**Topics and Problems in 20th Century French Literature**  
A. 3 cl.  
Prereq.: 626 or equiv.  
Intensive study of a specific topic or problem, with readings of selected literary and critical works. Astier.

829 (803) G 3  
**Old Provencal**  
A. 3 cl.  
Prereq.: 813 or Span. 813.  
Origin of the troubadour lyric; its history, as to form and content, in the 11th and 12th centuries; elements of phonology and morphology. Kellum.

829 (804) G 3  
**Old Provencal**  
W. 3 cl.  
Prereq.: 828.  
Troubadour lyric in the 13th century; increased attention to non-lyric genres, and to prose; continuation of linguistics, with greater emphasis on semantic problems. Kellum.

831 (811) G 2-5  
**Seminar in French Literature**  
Su (2-3 cr. hrs.), A, Sp. (3-5 cr. hrs.).  
Prereq.: Permission of instructor.

832 (812) G 2-5  
**Seminar in French Literature**  
Su (2-3 cr. hrs.), W, Sp. (3-5 cr. hrs.).  
Prereq.: Permission of instructor.

833 (817) G 3-5  
**Seminar in French Literature**  
W, Sp.  
Prereq.: Permission of instructor.

844 G 3  
**Major Authors of the 17th Century**  
Sp. 3 cl.  
Prereq.: 622 or permission of instructor.  
Intensive exploration of representative works. Davidson.

885 (731) G 5  
**Introduction to Methods in the History and Criticism of Literature**  
A. 4 or 5 cl.  
Selected readings in basic literary history, criticism, and theory, with practice in the use of standard bibliographical aids to scholarship. Davidson.

886f (880) G 3  
**Bibliography and Method**  
Sp. 3 cl.  
A course to acquaint graduate students with tools, problems, and methods of linguistic and literary research. Williams.

993 G 1-5  
**Individual Studies in French**  
Prereq.: Permission of instructor.  
Repeatable to a maximum of 15 cr. hrs.

994 G 1-15  
**Group Studies in French**  
Prereq.: Permission of instructor.  
Repeatable to a maximum of 30 cr. hrs.  
Investigation of minor problems in the various fields of French literature and language.

999 (950) G Arr.  
**Research in French Language or Literature**  
Research for thesis and dissertation purposes only.

## Genetics

Office: 103 Botany and Zoology Building, 1735 Neil Avenue

Professors Grifking (Chairman), Fechheimer, Harvey, House, Jaap, Kriebel, Paddock, Plaine, Rothenbuhler, Weaver, and Young; Associate Professors Byers, Swiger, and Skavaril; Assistant Professors Alaine, Aubele, and Clay; Instructor Essman.

314 U 5  
**Principles of Heredity**  
A, W, Sp. 5 cl.  
Prereq.: Biol. 101, and 1 qtr. of college level Math.  
Not open to students with credit for Biol. 130, 314, or (403).  
A general course in principles of heredity, emphasizing both classical and modern genetics. Clay.
630 U G 5
Genetics
A, W. 5 cl.
Prereq.: Biol. 190, Zool. 101 and Bot. 102 or equiv.; Math. 116 or equiv.
Not open to students with credit for Biol. 630 or (604).
A fundamental study of transmission, physiological and evolutionary genetics, emphasizing integrating principles. House.

631 U G 5
The Cytological Basis of Genetics
W. 2 cl., 3 2-hr. labs.
Prereq.: 630 or equiv.
Not open to students with credit for Biol. 631 or (618).
Documentation of the correlation between genetic principles and chromosome behavior by studying the mitotic and meiotic cells of several organisms with oil immersion microscopy. Paddock. Fee.

632 U G 5
Plant Genetics
A. 3 cl., 2 2-hr. labs.
Prereq.: 630, Bot. 101 or 102 or 500, and 10 additional cr. hrs. in Biological Sciences.
Not open to students with credit for Bot. 650 or (635).
Effects of lethals, linkage, heterozygy, introgression, polyploidy, self-incompatibility, and cytoplasm; laboratory experience with aceto-carmine smears, colchicine, progeny tests, random number tables, and herbarium specimens. Paddock. Fee.

650 U G 5
Analysis and Interpretation of Biological Data I
A, Sp. 4 cl., 1 2-hr. lab.
Prereq.: Math. 150 or equiv. and 15 cr. hrs. of courses at the 300- level or higher in a dept. of the College of Agriculture and Home Economics or in the College of Biological Sciences.
Not open to students with credit for Biol. 650 or (630).
Methods of analyzing biological data including: sampling, descriptive statistics, distributions, group comparisons, statistical inference, one-way and nested analysis of variance and linear regression and correlation. Skavaril. Fee.

651 U G 5
Analysis and Interpretation of Biological Data II
Su, W. 4 cl., 1 2-hr. lab.
(Given in Su. Qtr. at Wooster only)
Prereq.: 650 or Biol. 650.
Not open to students with credit for Biol. 651.
Methods used in analyzing data classified in two or more ways: Latin-square, split-plot and factorial designs, analysis of covariance, data transformations, multiple regression and least-squares. Harvey and Weaver. Fee.

693 U 2-5 G 2-10
Individual Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs. for undergraduate credit and to a maximum of 35 cr. hrs. for graduate credit.

Individual work in the field of the chosen problems.
b. Physiological and developmental genetics. Aubele and House.
c. Mathematical and population genetics. Allaire, Clay, Griffing, Harvey, Jaap, Skavaril, Swiger, and Young.

694 U 2-5 G 2-10
Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs. for undergraduate credit and to a maximum of 35 cr. hrs. for graduate credit.
Group work in the field of the chosen program. (See areas in 693.)

730+ U G 3 or 5
Cytogenetics
Sp. 3 cl., 2 2-hr. labs.
Prereq.: 630 and 631 or Biol. 630 and 631.
Not open to students with credit for Biol. 730 or (740).
Origin, transmissibility, and effects of chromosomal aberrations; their usefulness in practical breeding and in attacks on fundamental cytogenic problems. Paddock. Fee.

800 G 1
Genetic Seminar
A, W, Sp. 1 1/2-hr. cl.
Prereq.: Permission of instructor.
Repeatable to a maximum of 10 cr. hrs.
Faculty, graduate students, and outside speakers will participate. Young.

830+ G 5
Physiological Genetics
Sp. 5 cl.
Prereq.: 1 qtr. each of Physiol., Embryol., and Biochem.
Not open to students with credit for Biol. 830.
A consideration of the theoretical and experimental aspects of physiological genetics, pertaining to the concept of the gene, its biochemical nature, replication, and mutation.

831+ G 5
The Nature of Gene Action
Sp. 5 cl.
Prereq.: 1 qtr. each of Physiol., Embryol., and Biochem.
Not open to students with credit for Biol. 831.
A study of the action of genes at all levels of expression with special emphasis on the role of genes in developmental processes. House.

832 G 5
Mathematical Genetics
Sp. 4 cl., 1 2-hr. lab.
Prereq.: 30 cr. hrs. in Genetics, Math., and Statistics.
Not open to students with credit for Biol. 832 or (816).
The construction of mathematical models, use of path coefficients, generation matrices, least-squares and maximum likelihood methods for estimating genetic parameters and breeding values in quantitative genetics. Harvey.
Behavior Genetics
(See Zoology 840.)

850 G 5 Theoretical and Experimental Population Genetics
W. 5 cl.
Prereq.: 12 cr. hrs. of college level Math.; 5 cr. hrs. of applied or mathematical statistics; 1 course in general genetics.
Discussion of mathematical theories in population genetics and experimental works on natural and laboratory populations. Young.

999 G Arr.
Research in Genetics
Research for thesis and dissertation purposes only.

Geodetic Science

Office: 236 Graduate School, 164 West 19th Avenue
Professors Uotila (Chairman), Heiskanen (Emeritus), Moritz (Adjunct), and Mueller; Associate Professors: Ghosh, Merchant, and Rapp; Assistant Professor Adler.

GENERAL PREREQUISITES FOR ALL 500-LEVEL COURSES
Prerequisite for all 500-level courses in Math. 151.

512 U 5 Field and Land Surveying
W. 4 cl., 1 3-hr. lab.
Basic plane surveying techniques for geodetic science students.

513 U 5 Geodetic Surveying
A. 4 cl., 1 3-hr. lab.
Prereq.: 512 or permission of instructor.
Geodetic surveying techniques with emphasis on United States field procedures.

522 U 5 Geometric Photogrammetry
A. 4 cl., 1 3-hr. lab.
History; central projection; principles of orientation; principles of optics; photography; stereovision and basic parallax formulae; geometry of single image photogrammetry; radial triangulation, rectification; map compilation.

GENERAL PREREQUISITES FOR ALL 600-LEVEL COURSES
Prerequisites for all 600-level courses include Math. 254 and Physics 131.

613 U G 5 Introduction to Advanced Geodesy
W. 5 cl.
Prereq.: 513, and 641; prereq. or concur. 642.
Not open for graduate credit to students registering for 614 or 863.
Geometrical and physical geodesy; three-dimensional geodesy; classical and modern concepts of geodesy; the dynamic earth.

614 U G 5 Fundamentals of Geometric Geodesy
W. 4 cl., 1 2-hr. lab.
Prereq.: 513, and 641; prereq. or concur. 642.
Fundamental parameters of ellipsoidal geometry, normal section, geodesics; ellipsoidal triangles; direct and inverse problems; differential formulae.

624 U G 5 Instrumentation in Photogrammetry
W. 4 cl., 1 3-hr. lab.
Prereq.: 522; Physics 132; or permission of instructor.
Introduction to Rectifiers and Third, Second and First-order stereo-plotters; optical, mechanical and photo-geoniometer type instruments; evaluation, testing, and adjusting of stereoplotters instruments.

625 U G 4 Photo Interpretation
A. 3 cl., 1 3-hr. lab.
Prereq. or concur.: 522 or permission of instructor.
Principles of reading, analysis and interpretation of photographs; application of photographs in geological, forest, agricultural, geographical, etc., interpretations; using the techniques of non-mapping problems.

626 (721) U G 4 Aerial and Terrestrial Photography
A. 3 cl., 1 3-hr. lab.
Prereq.: 522; prereq. or concur. Physics 132 or permission of instructor.
Properties, design and calibration of various photogrammetric cameras; physical characteristics and quality control of photography; photogrammetric airplanes and auxiliary devices; image evaluation.

627 U G 5 Introduction to Advanced Photogrammetry
W. 4 cl., 1 3-hr. lab.
Prereq.: 522 and 641; prereq. or concur. 542, and Physics 132.
Not open for graduate credit to students registering for 604, 823, or 826.
Projective transformation and its differential forms; metric quality photography and camera; calibration; instruments—concepts of orientation and control extensions; elements of computational photogrammetry.

631 U G 3 Map Projections
Sp. 3 cl.
Projections of the sphere; projections of the ellipsoid to the sphere; the mathematics of the principal map projections used for major map series.
641 U G 5
Applied Mathematical Methods in Geodetic Science
A. 5 cl.
Mathematical techniques used in geodetic science; tensor and vector analysis; matrix computations; special functions; spherical harmonics.

642 (653) U G 5
Introduction to Adjustment Computations
W. 4 cl., 1 3-hr. lab.
Prereq.: 641.
Accuracy estimate; statistical framework, error propagation, covariances, weights; linear and nonlinear models, normal equations, residuals; confidence interval, tolerance limits; observation and condition equations combined.

657 (758) U G 5
Instrumentation in Electronic Surveying
A. 4 cl., 1 3-hr. lab.
Prereq.: 613 or 614, and Physics 133.
Introduction to electronic surveying systems; analysis of electronic and electro-optical instruments, especially referring to accuracy and portability; theory of geometry of electronic location.

663 (617) U G 5
Geodetic Astronomy
Sp. 3 cl., 2 3-hr. labs.
Prereq.: 513, 641, and Astron. 611.
The determination of time, latitude, longitude, and azimuth from astronomical observations; the application of solar eclipses, and lunar occultations in geodesy.

666 U G 5
Field Work in Geodesy
Su (1st term). 1 cl., 5 4-hr. labs.
Prereq.: 513.

667 U G 5
Field Work in Geodetic Astronomy
Su (2nd term). 1 cl., 5 4-hr. labs
Prereq.: 663.

668 U G 5
Field Work in Photogrammetry
Su (2nd term). 4 cl., 5 4-hr. labs.
Prereq.: 512 and 522.

669 U G 5
Field Work in Distance Measurement
Su (1st term). 1 cl., 5 4-hr. labs.
Prereq.: 512.

683 U G 2-9
Individual Studies in Geodetic Science
Prereq.: Permission of instructor,
Repeatable to a maximum of 30 cr. hrs.
Assignments reading laboratory or field work, under the guidance of a staff member, arranged to meet the requirements of individual students.

684 U G 2-9
Group Studies in Geodetic Science
Prereq.: Permission or instructor.
Repeatable to a maximum of 30 cr. hrs.

GENERAL PREREQUISITES FOR ALL 800-LEVEL COURSES
Prerequisite for all 800-level courses is Geod. Sc. 642.

812 G 5
Geometric Geodesy
Sp. 4 cl., 1 2-hr. lab.
Prereq.: 614.
Reduction of observations to the ellipsoid; Laplace stations; triangulation observation equations; refraction; determination of the size and shape of the reference ellipsoid; fundamentals of three-dimensional geodesy.

821 (723) G 5
Stereophotogrammetry
A. 4 cl., 1 3-hr. lab.
Prereq.: 624 or permission of instructor.
Interior and exterior orientations; model errors and parallax formulas; various methods of relative and absolute orientations; analysis of model deformations; qualitative evaluation of oriented models.

822 (725) G 5
Photogrammetry in Practice
W. 4 cl., 1 3-hr. lab.
Prereq.: 821 or permission of instructor.
Flight plans; terrestrial station project; ground control and signalization in terrestrial and aerial photogrammetry; plotting and data reduction; various applications; accuracy and economy; cost computation.

823 G 4
Theory of Errors in Photogrammetry
Sp. 2 cl., 2 3-hr. labs.
Prereq.: 825.
Multicamera spatial resection, strip and block triangulation; functional and weight constraints; applications of confidence intervals, tolerance limits and representative objective tests of instruments and processes.

825 G 5
Analytical Photogrammetry
W. 4 cl., 1 3-hr. lab.
Prereq.: 522; prerequisite or concur. 846.
Projective transformation and its differential forms; comparison, utilization; representative errors, tests distortions, refraction, film deformations; treatment of all unknown photogrammetric parameters as observed quantities.

826 G 5
Aerial Triangulation
Sp. 4 cl., 1 3-hr. lab.
Prereq.: 821; prerequisite or concur. 846.
Spatial aerial triangulation at first order stereo instruments; independent pairs of photographs; strip and block triangulation; auxiliary data; independent geodetic control; radial triangulation; accuracy and economy.
844 G 5
Geodetic Applications of Digital Computers
W. 3 cl., 1 2-hr. lab.
Prereq.: Math. 241 and permission of instructor.
Advanced programming techniques; computer developments and use in geodesy, photogrammetry and cartography.

846 G 5
Adjustment Computations
Sp. 4 cl., 1 3-hr. lab.
Prereq.: 613 or 627.
Constraints; generalized least squares; adjustment in blocks; error ellipse and ellipsoid; iterative solutions; testing multivariate linear hypotheses; problems in non-linear least squares.

847 G 5
Mathematical Projections in Geodesy
A. 4 cl., 1 2-hr. lab.
Prereq.: 613 or 614, and 631.
General surface to surface mapping; conformal projections; Transverse Mercator; Lambert conformal conic; transformation equations; ellipsoid to ellipsoid mapping.

852 (759) G 4
Applications in Electronic Surveying
W. 3 cl., 1 3-hr. lab.
Prereq.: 657.
Propagation velocity, soil conductivity, ionospheric and ground reflections; curvature of the ray path, correction to spatial chord, reduction on to the ellipsoid, trilateration, control extension.

853 G 3
Navigation
Sp. 3 cl.
Prereq.: 657.
Sea, air, and space navigation; analysis of instruments, accuracy, range, and portability; analysis of environment factors and geometric aspects.

863 (751) G 5
Gravimetric Geodesy
A. 4 cl., 1 3-hr. lab.
Prereq.: 614 and Geol. 643.
Applications of gravimetry in geodesy; classical and modern theories in gravimetric geodesy; the gravitational field of the earth.

868 (855) G 5
Satellite Geodesy
W. 4 cl., 1 3-hr. lab.
Prereq.: 613 or 614, and 663.
The geometrical and dynamic applications of artificial satellites and the moon in geodesy; stellar triangulations.

885 G 2-8
Research Principles and Techniques
Prereq.: Permission of instructor.
Repeatable to a maximum of 30 cr. hrs.

887 (795) G 1-5
Seminar
Prereq.: Permission of instructor.
Repeatable to a maximum of 30 cr. hrs.

994 (794) G 2-9
Group Studies in Geodetic Science
Prereq.: Permission of instructor.
Repeatable to a maximum of 30 cr. hrs.

999 (950) G Arr.
Research in Geodetic Science

Geography
Office: 156 Hagerty Hall, 1775 South College Road
Professors Taaffe (Chairman), E. Brown, Carlson (Emeritus), Hunker, Patten, Randall, Smith (Emeritus), and Van Cleef (Emeritus); Associate Professors L. Brown, Casati, Cox, Demko, Gauthier, Goledge, and Rayner; Assistant Professors Lentnek, Leversedge, Witthuhn, and Sheek.

200 (504) U 5
World Regional Geography
Su, A, W, Sp. 5 cl.
A comparative study of representative regions of the world; an examination of the cultural, social, economic, and political developments in relation to the geographical conditions.

220 (401) U 5
Introduction to Geography
Su, A, W, Sp. 5 cl.
H220 (honors) may be available to students enrolled in a college honors program; others with permission of dept.
The elements of the natural environment, their characteristics, distribution, and significance in the human habitat.

240 (403) U 5
Economic Geography
Su, A, W, Sp. 5 cl.
H240 (honors) may be available to students enrolled in a college honors program; others with permission of dept.
Not open to students with credit for 340.
Geography of the world's principal commodities; a survey of the economic activities of the major political areas in relation to their geographic conditions.
400  (505)  U 3  
Geography of United States and Canada  
W. Sp. 3 cl.  
Prereq.: Either 200, 220, 240, or equiv.  
A geographical analysis of the United States and Canada; the correlation of their natural resources and other environmental factors with their economic and cultural development.

401  (605)  U 3  
Geography of Ohio  
Sp. 3 cl.  
Prereq.: Either 200, 220, 240, or equiv.  
An appraisal of geographic factors in the development of Ohio's natural resources, agriculture, manufacturing, and commerce; historical development of the major economic factors.

505  (624)  UG 4  
Geography of Latin America  
A, W. 3 cl.  
Prereq.: Either 200, 220, 240, or equiv., or permission of instructor.  
Not open to students with credit for 405.  
Geographic analysis of Middle and South America emphasizing the interrelationships of the resource base, cultural characteristics, and outside influences upon economic development.  
505.01 Middle America  
A.  
Not open to students with credit for 405.01.  
505.02 South America  
W.  
Not open to students with credit for 405.02.

508  (627)  UG 4  
Geography of Africa  
Su. W. 3 cl.  
Prereq.: Either 200, 220, 240, or equiv., or permission of instructor.  
The African environment and the development of culture and economic life; impact of alien culture in Africa; Islamic and western influences in creating geographic regions.

510  (621)  UG 4  
Geography of Western Europe  
Sp. 3 cl.  
Prereq.: Either 200, 220, 240, or equiv., or permission of instructor.  
Not open to students with credit for 410.  
Geographic factors in the economic, social, and political progress of the nations of Western Europe; major problems of the area in the light of their geographic background.

511  (620)  UG 4  
Geography of Eastern Europe  
W. 3 cl.  
Prereq.: Either 200, 220, 240, or equiv., or permission of instructor.  
Not open to students with credit for 411.  
Resources, their assessment, and development, and related problems in Eastern Europe; the geographic significance of each state to the Communist bloc and to the West.

512  (622)  UG 4  
Geography of the Soviet Union  
A, Sp. 3 cl.  
Prereq.: Either 200, 220, 240, or equiv., or permission of instructor.  
Not open to students with credit for 412.  
The major regional divisions of the Soviet Union; the resource base in relation to the economic and political aims of the Soviet State.

515  (626)  UG 4  
Geography of the Middle East  
Sp. 3 cl.  
Prereq.: Either 200, 220, 240, or equiv., or permission of instructor.  
Not open to students with credit for 415.  
The Middle East and its natural regions in relation to local and international problems; physical and cultural patterns in relation to the current economies.

516f  (625)  UG 4  
Geography of the Far East  
Sp. 3 cl.  
Prereq.: Either 200, 220, 240, or equiv., or permission of instructor.  
Not open to students with credit for 416f.  
The geographic divisions of southern, southeastern, and eastern Asia; the major activities of the people in the regions of densest population and greatest economic importance.

520  (615)  UG 4  
Climatology  
A. 3 cl.  
The elements and the controls of climate; types of climate and their distribution; climates and their effects on the economic and other activities of man.

530  (604)  UG 4  
Conservation of Natural Resources  
W. 3 cl.  
Economic and geographic appraisal of resource conservation in the United States; regional and national planning for resource utilization.

545  (630)  UG 4  
Geography of Transportation  
W. 3 cl.  
A geographical analysis of the nature and distribution of rail, water, highway, pipeline, and air transport facilities and their importance in regional development.

550  (712)  UG 4  
Political Geography  
Su, A. 3 cl.  
Prereq.: Permission of instructor.  
The geographical characteristics of nation states; the geographical factors in the evolution, structure, and function of states; the relation of geopolitics to political geography.

580  (510)  UG 4  
An Introduction to Cartography  
W. 3 cl.  
Cartographic techniques, map compilation, scales, generalization, symbolization, grid systems, reproduction, and map-making instruments and equipment.
605 U G 5
Special Problems in the Geography of Latin America
Sp. 3 cl.
Prereq.: 405 or permission of instructor.
Repeatable to a maximum of 10 cr. hrs.
The analysis of selected topical problems in Latin American geography; typical problem areas are urbanization, industrialization, transportation, agricultural development, and regional development.

612† U G 5
Special Problems in the Geography of the U.S.S.R.
Sp. 4 cl.
Prereq.: 512 or permission of instructor.
Repeatable to a maximum of 10 cr. hrs.
Spatial analysis of selected topical problems in Soviet geography.

620† U G 5
Intermediate Climatology
W. 4 cl., 1 1-hr. lab.
Prereq.: 520 or equiv. and permission of instructor.
Detailed analysis of atmospheric processes, the general circulation and associated macro- and micro-climates; forecasting climatic parameters; applied climatology and bioclimatology; climate and change.

640 (603) U G 5
Location of Manufacturing
A, W. 3 cl.
Prereq.: Permission of instructor.
The changing character and concentration of industrial districts; representative industries in relation to labor supply, sources of raw material and power, transportation, and markets.

642 U G 5
Geography of Development
A. 3 cl.
Prereq.: Permission of instructor.
Spatial aspects of economic development; spatial analysis of traditional economics, industrial regions, transport linkages and migration patterns in developing countries.

647 (633) U G 5
Locational Analysis
W, Sp. 3 cl.
Prereq.: Permission of instructor.
Historical review of major location theories and evaluation of application of such theories to geographic problems.

650 (634) U G 5
Urban Geography
A, W, Sp. 3 cl.
Prereq.: Permission of instructor.
Origin and growth of cities; structure and function of urban centers, their areal expansion, and intertrade center relations, each examined in relation to city planning.

660 U G 5
Intermediate Political Geography
W. 3 cl.
Prereq.: 560 or equiv. and permission of instructor.
Application of spatial analysis and related models, behavioral theory, and quantitative techniques to the study of the spatial dimensions of political activity.

670 U G 5
Population Geography
W. 3 cl.
Prereq.: 240.
Analysis of population distributions, locational arrangements of growth, densities, and migration flows; spatial relationships between population variables and social, economic, and environmental factors.

Natural Resources Problems, Programs, and Policies
(See Agr. Econ. 660.)

681† (611) U G 5
Cartography and Map Interpretation
W. 3 cl.
Map projections and their uses for particular maps and the map series published by the United States government, by foreign countries, and by private map-producing organizations.

682† (702) U G 3-5
Individual Studies in Cartography
Prereq.: Permission of instructor.
Individual study of cartographic subjects: map compilation, map design, color separation, map reliability, analysis of source materials, toponymy, graphical symbolism, physiographic drawing, etc.

693 (701) U G 1-15
Individual Studies
Prereq.: Permission of instructor.
Repeatable with permission of instructor.
Individual study of a special problem or of a particular region.

694 (798) U G 5
Group Studies
W, Sp.
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.
Group study of special topics in various fields of geography.

695 U 5
Undergraduate Seminar in Applied Geography
Sp. 2 1-hr. cl.
Prereq.: 20 cr. hrs. in Geog.
The practical application of theoretical geographical concepts to problems in the local area.

Introduction to National Security
(See Nat. Sec. Pol. S. 702.)
Advanced Locational Analysis
Sp. 2 hr. cl.
Prereq.: 647 or permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Discussion of advanced problems in locational and regional analysis; application of programming techniques, the transportation model, spatial equilibrium analysis, multiregional activity analysis, and regional growth models.

Research Principles and Techniques in National Security
(See Nat. Sec. Pol. S. 785.)

Seminars in Regional Geography
Sp. 2 cl.
Repeatable to a maximum of 20 cr. hrs.
Geographical investigation of a selected area; the region under study will be announced.

Seminar in National Security Research
(See Nat. Sec. Pol. S. 801.)

Seminars in Physical Geography
A, W, Sp. 2 cl.
Each decimal subdivision repeatable to a maximum of 20 cr. hrs.
820.01 Problems in Climatology
820.02 Problems in Soils Geography
820.03 Special Problems

Dynamic Climatology
A. 2 2-hr. cl.
Prereq.: 620 or permission of instructor.
Dynamics, thermodynamics, energy conservation, flows, conversion processes; large scale circulation patterns with particular emphasis upon turbulence at the synoptic scale; weather processes, and regional climates.

Microclimatology
W. 2 2-hr. cl.
Prereq.: 620 or permission of instructor.
Radiation and turbulence processes, conduction; variation in wind, temperature, humidity, soil moisture, evaporation, soil temperature; influence of vegetation and artificial structures.

Applied Climatology
Sp. 2 2-hr. cl.
Prereq.: 620 or permission of instructor
Effects of climate upon plants and animals (bioclimatology), upon industrial processes and structures, and upon landforms; forecasting; climate modification.

Seminars in Resource Analysis
Each decimal subdivision repeatable to a maximum of 30 cr. hrs.
The development of theory in resource analysis and its application to selected problems.
830.01 Theory of Resource Analysis
830.02 Problems of Resource Analysis

Seminars in Economic Geography
A, W, Sp. 2 cl.
Readings and research in specific aspects of economic geography.
Each decimal subdivision repeatable to a maximum of 20 cr. hrs.
840.01 Location Theory
840.02 Special Topics

Seminars in Transportation Geography
Each decimal subdivision repeatable to a maximum of 30 cr. hrs.
The development of theory in transportation geography and its application to selected problems.
845.01 Theory of Transportation Geography
845.02 Problems in Transportation Geography

Seminars in Urban Geography
A, W, Sp. 2 cl.
The development of theory in urban geography and its application to selected problems.
Each decimal subdivision repeatable to a maximum of 20 cr. hrs.
850.01 Theory of Urban Geography
850.02 Problems in Urban Geography

Seminars in Political Geography
Sp.
Prereq.: 660 or permission of instructor.
Each decimal subdivision repeatable to a maximum of 30 cr. hrs.
The development of theory in political geography and its application to selected problems.
860.01 Theory of Political Geography
860.02 Problems of Political Geography

Seminars in Population and Social Geography
W, Sp.
Each decimal subdivision repeatable to a maximum of 20 cr. hrs.
The development of theory in population and social geography and its application to selected problems.
870.01 Theory of Population and Social Geography
870.02 Problems in Population and Social Geography

Cartography and Map Intelligence
Sp.
Readings and research in cartography, graphics, and map intelligence.
Development of Geographic Thought
A. 3 cr.
The evolution of concepts concerning the nature, scope, and methodology of geography; present focus and trends as reflected in current literature.

Application of Quantitative Methods in Geography
A, W. 2 cr., 2 lab.
Prereq.: Course in introductory statistics and permission of instructor.
Application of quantitative methods to geographic problems; spatial statistics, area sampling, maps of residuals, regionalization methods, and simulation maps.

To be taken in sequence:

- 883.01 Applications I
- 883.02 Applications II

Field Work in Geography
Sp. 2 cr., Sat. lab.
The practice of field observation and geographic mapping.

Seminars in Geography
Repeatable to a maximum of 20 cr. hrs.
Topics to be announced each quarter.

Interdepartmental Seminar in Polar and Alpine Studies
Sp.
(See under Interdepartmental Seminars.)

Interdepartmental Seminar in Natural Resources
(See under Interdepartmental Seminars.)

Interdepartmental Seminar
W.
Topics to be announced each quarter.

Special Topics in Quantitative Geography
A, W, Sp. 1 3-hr. cl.
Prereqs.: 883.01 and 883.02.
Repeatable to a maximum of 15 cr. hrs.
Applications of advanced mathematical and statistical models to problems in geographical analysis.

Research in Geography: Thesis
Research for thesis purposes only.

Research in Geography: Dissertation
Research for dissertation purposes only.

Geology

Office: 107 Mendenhall Laboratory, 125 South Oval Drive
Professors Bull (Chairman), Bates, Bostick, Faure, Goldthwait, Lamert (Emeritus), La Rocque, Moore, Schopf, Specker (Emeritus), Stephenson, Sweet, and White; Distinguished Visiting Professor Schuyt; Adjunct Professor Anderson; Associate Professors Mayer, Pettyjohn, and Summerson; Adjunct Associate Professor Geary; Assistant Professors Bergstrom, Collinson, Elliot, Fleck, McKenzie, Stephens, and Ughtard; Adjunct Assistant Professors Cameron and Dewart; Instructor Foster.

100  (416)  U 5
Introduction to Geology
Su, A, W, Sp. 4 cr., 1-hr lab., arr., 1 half-day field trip.
Not open to students with credit for 101, 102, (401), (402), or (451).
Recommended for nonscience majors.
The materials of the earth's crust, the processes that produce and modify them, and the development of the earth and its life forms through time.

101  (417)  U 5
Physical Geology
A, W, Sp. 4 cr., 1 2-hr. lab., 1 half-day field trip.
H101 (honors) may be available to students enrolled in a college honors program or by permission of dept.
Prereq.: Eligibility for Math 130.
Not open to students with credit for (401) or (451),
Recommended first course in Geol. for science majors or those with substantial background in science.
Minerals and rocks and their origin; land forms and how they are produced; structural features of the earth's crust.

102  (418)  U 5
Historical Geology
A, W, Sp. 4 cr., 1 2-hr. lab., 1 half-day field trip.
H102 (honors) may be available to students enrolled in a college honors program or by permission of dept.
Prereq.: 100 or 101.
Not open to students with credit for (420).
The history of the earth and its inhabitants through geologic time.

201  (520)  U 5
Introduction to Paleontology
Sp. 4 cr., 1 2-hr. lab.
Prereq.: 100 or 101.
An introduction to animal and plant groups significant in the geologic record. Fee.

202  (524)  U 3
The Common Minerals and Rocks
W. 3 2-hr. labs.
Prereq.: 101 and Chom. 121.
Not open to Geol. majors or students with credit for 203.
A study of the common minerals and rocks, their associations, occurrences, identifying properties, and origin. Moore.
203 U 5
The Common Rocks
A, Sp. 2 cl., 3 2-hr. labs.
Prereq.: 101 or 401 or (412) and Mineral. 412 or 422.
Not open to students with credit for 202.
Origin, occurrence, association, and mineral composition of the common rocks; laboratory includes work by macroscopic and microscopic methods. Moore.

204 U 5
Water Resources
W. 5 cl., 2 1/2-day field trips.
Prereq.: 100 or 101.
Occurrence, movement and behavior of water in the hydrologic cycle with reference to scientific and technological problems relating to water-resources development and conservation. Pettyjohn.

205 U 3
Quantitative Methods in Geology
A, Sp. 2 cl., 1 2-hr. lab.
Prereq.: 101 or preq. or concur. 102 and Math. 161; or permission of instructor.
Introduction to quantitative methods and techniques, both graphical and mathematical, and their application in the analysis of geologic data. Corbato.

206 U 3
Oceanography and Marine Geology
Sp. 3 cl.
Prereq.: 100 or 101.
Not open to students with credit for 632.
The origin, development, and structure of ocean basins and their contents; contemporary oceanic processes of geologic significance. Anderson.

Elementary Mineralogy and Crystallography
(See Mineral. 421.)
(Of offered in cooperation with the Dept. of Mineral.)

Elementary Optical Mineralogy
(See Mineral. 422.)
(Of offered in cooperation with the Dept. of Mineral.)

502 U G 5
Stratigraphy and Paleontology
A, Sp. 6 days in field in late Su. or just preceding A. or Sp; 2 2-hr. labs. and field trips in A. or Sp.
Prereq.: 102, 203, 205, and 10 cr. hrs. in Biological Sciences.
Principles of, and procedures in, lithostratigraphy and biostratigraphy, illustrated by field and laboratory studies of sedimentary rocks and fossils. Bates, Bergstrom, Collinson, and Sweet. Fee.

530 U G 5
Structural Geology and Geophysics
W. 4 cl., 1 2-hr. lab.
Prereq.: 205 and Physics 132 or 133.
A study of the principal kinds of geologic structures and their interpretation; an introduction to geophysical exploration of subsurface structures. Fleck and Moore.

550 U G 5
Geomorphology
A, Sp. 4 cl., 1 2-hr. lab., field trips.
Prereq.: 101 or permission of instructor.
Detailed study of processes that shape the land surface and the forms produced under diverse climates. White. Fee.

570 U G 1-3
Senior Thesis
Prereq.: Senior standing in Geol.
Repeatable to a maximum of 3 cr. hrs.
The preparation of a report of professional quality, based on a research project.

580 U 5
Field Work in Earth Science
Su (1st term). Requires full time of student for 5 wks.
Prereq.: 30 qtr. hrs. in Geol., Geog., Astron. or Meteor. with a minimum of 15 qtr. hrs. in Geol.; Ed. 604 and permission of instructor; Geol. 201, 202, and 550 recommended.
Not open to Geol. majors.
Essentials of field observation, mapping and data accumulation in the solution of earth-science problems; the work is done in selected off-campus field localities. Mayor. Fee.

581 U G 5
Field Geology I
Su (1st term). Requires full time of student.
Prereq.: 203, 205, and permission of instructor; 530 recommended.
Not open to students with credit for 581.01.
Concentrated training in the basic essentials of field observation and mapping; the work is done in central Utah, with headquarters in Ephraim. Collinson. Fee.

582 U G 5
Field Geology II
Su (2nd term). Requires full time of student.
Prereq.: 581.
Not open to students with credit for 581.02.
Continuation of 581. Fee.

600 U G 5
Sedimentation and Sedimentary Rocks
A. 4 cl., 1 3-hr. lab.
Prereq.: 502.
Source, dispersal, and accumulation of sediments; the interpretation of the environmental distribution of sedimentary rocks. Summerson.

601 U 5
Sedimentary Petrology
W. 3 cl., 2 2-hr. labs.
Prereq.: 600 or permission of instructor.
Interpretation of sedimentary rocks based on mineralologic and textural study of thin sections and grain mounts.
<table>
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<tr>
<th>Course Code</th>
<th>Credits</th>
<th>Description</th>
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| 603         | U G 5   | Stratigraphy  
W. 3 cl., 2 2-hr. labs.  
Prereq.: 502.  
Advanced study of the principles and procedures of stratigraphic nomenclature, subdivision, correlation, and interpretation, with examples from the international stratigraphic record. Bates, Bergstrom, Collinson, and Sweet. |
| 614         | U G 5   | Paleobiology  
A, W. 2 cl., 3 2-hr. labs.  
Prereq.: 201 or 502 or 580.  
Repeatable to a maximum of 10 cr. hrs.  
Advanced consideration of the preservation, morphology, development, interrelations, and paleoecologic significance of fossil animals and plants. Bergstrom, La Rocque, Schoff, Stephens, and Sweet. |
| 620         | (740)   | U G 5  
Introduction to Isotope Geology  
W. 5 cl.  
Prereq.: Senior standing in Geol., Mineral., or related fields.  
Theory of natural isotope abundance variations and applications to problems in the earth sciences. Faure and Fleck. |
| 621         | U G 5   | Introduction to Geochemistry  
A. 5 cl.  
Prereq.: Senior standing in Geol., Mineral., or related fields; Chem. 122 or equiv.  
Applications of the law of mass action and chemical thermodynamics to mineral equilibria of geological and geochemical interest. Faure. |
| 626         | U G 5   | Metamorphic Petrology  
Sp. 3 cl., 2 2-hr. labs.  
Prereq.: Permission of instructor.  
Not open to students with credit for 820.  
(Offered in cooperation with Dept. of Mineral.)  
Petrography, petrogenesis, and occurrence of metamorphic rocks; macroscopic and microscopic examination of metamorphic rocks and selected petrographic suites in the laboratory. Ehlers. |
| 640         | (634)   | U G 5  
Fundamentals of Geophysics  
A. 4 cl., 1 2-hr. lab.  
Prereq.: 530.  
| 643         | (735)   | U G 3  
Geophysics Gravimetry  
A. 3 cl.  
Prereq.: 4th yr. standing in Geol.; or 4th yr. standing in Geol., Sci., Physics, Civil E., and one of the following: 101, 103, 401, 430, 451.  
| 650         | (613)   | U G 5  
Glacial and Pleistocene Geology  
Sp. 5 cl., field trips.  
Prereq.: 550.  
The features produced by glaciers, present and past, and the history of glaciation during the Pleistocene. Goldthwait. Fee. |
| 651         | (637)   | U G 5  
Hydrogeology  
Sp. 5 cl. 2 1/2-day field trips.  
Prereq.: Senior standing in Geol.; or 4th yr. standing in Engr. and 101; or 101 and 204.  
Geologic and hydrologic factors controlling the occurrence and behavior of ground water. Pettyjohn. Fee. |
| 660         | (605)   | U G 5  
Geology of Mineral Deposits  
W. 4 cl., 1 2-hr. lab.  
Prereq.: 203.  
Not open to students with credit for 560, or 662.  
The occurrence, origin, and distribution of metallic and nonmetallic minerals, and their properties and uses. Bates and Faure. |
| 661         | (607)   | U G 5  
Petroleum Geology  
Sp. 3 cl., 2 2-hr. labs.  
Prereq.: 502 and 530.  
A study of the principles of petroleum geology. Bates. |
| 670         | U G 5   | General and Economic Geology of Selected Areas  
10-day period preceding A. Post-trip readings and report.  
Prereq.: 502, 530, and 550, or permission of instructor.  
Not open to students with credit for (608), 680, or 681.  
Concentrated field study of the stratigraphy, structural geology, tectonics, petrology, and geomorphology of a selected region, with special attention to the economic utilization of earth materials. Bates, Bergstrom, Summerson, and Sweet. Fee. |
693 U G 1-5
Individual Studies in Geology
Prereq.: Permission of instructor.
Special problems in any branch of geology for which the student has the proper qualifications.
693.01 Economic Geology
693.02 Engineering Geology
693.03 Extraterrestrial Studies
693.04 Field Geology
693.05 Geochimistry
693.06 Geomorphology
693.07 Geophysics
693.08 Glaciology and Glacial Geology
693.09 History of Geology
693.10 Hydrogeology
693.11 Marine Geology, Limnology, and Oceanography
693.12 Paleontology
693.13 Petrology and Petrography
693.14 Photogeology
693.15 Sedimentation
693.16 Stratigraphy
693.17 Structural Geology
693.18 Earth Science Education
693.19 Unspecified

694 U G 1-5
Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Group study of special topics in various fields of Geology.

Igneous Petrology
(See Mineral. 722.)
(Offered in cooperation with the Dept. of Mineral.)

800 G 3
Seminar in Stratigraphy
A, W. 2 2-hr. cl.
Prereq.: Permission of instructor.
Repeatable to a maximum of 18 cr. hrs.
Consideration of current and classical problems and procedures in biostratigraphic and lithostratigraphic analysis and synthesis, Bates, Bergstrom, Collinson, Summerson, and Sweet.

801 G 3
Seminar in Sedimentation and Sedimentary Rocks
W, Sp. 2 2-hr. cl.
Prereq.: Permission of instructor.
Repeatable to a maximum of 18 cr. hrs.
Consideration of sedimentation, and the structures, petrography, depositional environments, and paleologic interpretation of sedimentary rocks. Summerson.

810 G 3
Seminar in Paleobiology
W, Sp. 2 2-hr. cl.
Prereq.: Permission of instructor.
Repeatable to a maximum of 18 cr. hrs.

Advanced topics in paleozoologic and paleobotanic morphology, taxonomy, and procedure; current questions in biostratigraphy, paleoecology, and evolutionary development of fossil floras and faunas. Bergstrom, La Rocque, Schoff, Stephens, and Sweet.

821 G 3
Seminar in Isotope Geology and Geochemistry
Sp. 2 2-hr. cl.
Prereq.: Permission of instructor.
Repeatable to a maximum of 18 cr. hrs.
Discussion of selected topics in isotope geology, geochronology, geochemistry, and cosmochemistry. Faure and Fleck.

822 G 2-3
Seminar in Petrology
A, W. 2 2-hr. cl.
Prereq.: Permission of instructor.
Repeatable to a maximum of 18 cr. hrs.
Theoretical, experimental, geographic, and petrographic topics in igneous, sedimentary, and metamorphic petrology. Ehiers, Everett, Fleck, Moore, and Shultz.

840 G 3
Seminar in Geophysics and Structural Geology
A, Sp. 2 2-hr. cl.
Prereq.: Permission of instructor.
Repeatable to a maximum of 18 cr. hrs.
Selected topics in solid-earth geophysics, glaciology, tectonics, structural analysis, or continental and ocean-basin structure. Bull, Corbato, Fleck, and Moore.

850 (827) G 3
Seminar in Geomorphology and Quaternary Geology
A, W. 2 2-hr. cl.
Prereq.: Permission of instructor.
Repeatable to a maximum of 18 cr. hrs.
Current and classical problems in geomorphology and Quaternary geology, such as desert and coastal geomorphology, submarine topography, periglacial and karst morphology, volcanology, and Quaternary geochronology. Goldthwait and White.

851 G 3
Seminar in Hydrogeology and Oceanography
A, Sp. 2 2-hr. cl.
Prereq.: Permission of instructor.
Repeatable to a maximum of 18 cr. hrs.
Topics in hydrogeology and oceanography, such as groundwater hydrology and hydraulics, basin management, reef and atoll development, or paleo-oceanography. Anderson, Pettyjohn, and White.

860 G 3
Seminar in Mineral Deposits and Fossil Fuels
Sp. 2 2-hr. cl.
Prereq.: Permission of instructor.
Repeatable to a maximum of 18 cr. hrs.
Study of selected deposits of metallic minerals, industrial rocks, and minerals, or fossil fuels. Bates, Faure, and Schoff.
Seminar in the History of Geology
Sp. 3 cl.
Discussion of the development of geology, intended to
give the student a firm basis for comprehension of the
science as it exists today. La Rocque.

Field Geology for Science Teachers
Sp. 5-day period during recess between W. and Sp.;
pre-trip meeting and post-trip report.
Prereq.: 100.
Open only to students registered in the Academic
Year Institute, or permission of instructor.
Not open to Geol. majors.
Application of geological principles in the field;
interpretation of earth features observable on a
traverse crossing the Appalachian Mountain system.
Bales and Mayer.

Interdepartmental Seminar
in Polar and Alpine Studies
Sp.
(See under Interdepartmental Seminars.)

Research in Geology
Research for thesis and dissertation purposes only.

German
Office: 314 Dieter Cunz Hall of Languages, 1841 Millikin
Road

Professors Hoffmann (Chairman), Bekker, Fleischhauer,
Maher (Emeritus), and Saidlin (Regents); Associate
Professors Belkin, Gottwald, Haas, and Schmidt;
Assistant Professors Edse, Goodman, Gray, Nelson,
Vitt, and Wells; Instructors Allerdissen, Armborst,
Chadeayne, McDonald, and Riechel.

Placement and Proficiency Examinations
Students with two years of high school German
registrants, placement tests are required of all
students who continue their study of German in the
department after beginning their language in high
school. Such tests are given on the first day of
instruction in each quarter. Consult the Humanities
section of the Colleges of the Arts and Sciences
catalog.

Students who are given advanced standing in the
department as a result of the placement and
proficiency examination become eligible for University
credit.

Excess Entrance Credits in German
Freshmen who have excess credits in foreign language
are eligible for examination for advanced standing.
The examination is given at the same time as the
placement tests mentioned above.

Elementary German
Credit in 101 will be counted toward graduation only
if followed by successful completion of 102, or if taken
after successful completion of the fourth regular
University course in another foreign language.

Intermediate German
Prereq.: 101 or equiv.

Intermediate German
Prereq.: Either 103, 112, or 113.
Reading of narrative prose; oral and written practice;
reading of narrative prose; oral and written practice;
reading of narrative prose; oral and written practice;

Elementary German Conversation
Prereq.: 102; also open to students with grade of A in
101. No audit.

Intensive German
Su. Enrollment limited to 20 students.
Prereq.: Permission of dept.
Full time of student and full fees required.
Students with credit for 101 or the equiv. may not
register for more than 10 cr. hrs. Students with credit
for 101 and 102 or the equiv. may not register for
more than 5 cr. hrs. Students with credit for 103 or
the equiv. may not register for credit. Register before
May 11. No audit.

Elementary and intermediate German for students
desiring comprehensive knowledge of German in
shortest possible time; students will devote their
entire time to this course.

Intermediate Scientific German
A, W, Sp. 5 cl.
Prereq.: 103.
Not open to students with credit for 103.
Introductory readings in scientific German.

Intermediate Scientific German
A, W, Sp. 5 cl.
Prereq.: Either 103, 112, or 113.
Not open to students with credit for 104.
Advanced readings in scientific German.
162 (417) U 5
Elementary-Intermediate German for Selected Students
W. 5 cl.
Prereq.: Grade of A in 101.
Not open to students with credit for 117.

163 (418) U 5
Elementary-Intermediate German for Selected Students
Sp. 5 cl.
Prereq.: 162.
Not open to students with credit for 118.
Successful completion of the sequence 101-162-163 fulfills language requirements and provides eligibility for 200-level courses.
Continuation of 162.

203 (503) U 3
Intermediate German Conversation
A, W, Sp. 3 cl.
Prereq.: 104 and 109 or equiv. with a minimum grade of C. 203 may be taken conc. with 204. No audit. Practice in spoken everyday idiomatic German, based on texts concerning German life today.

204 (504) U 2
German Composition I
A, W, Sp. 2 cl.
Prereq.: 104 and 109 or equiv. with a minimum grade of C. 204 may be taken conc. with 203. No audit. Practice in simple writing with some conversation.

205 U 2
German Composition II
W, Sp. 2 cl.
Prereq.: 204.
Themes, reports, and translations of difficult texts.

211 (502) U 3
German Review Grammar
A, W. 3 cl.
Prereq.: 104, 163, or equiv.
Not open to students with credit for 119.
Syntax and structure of the language.

221 (577) U 5
Introduction to German Literature: The 20th Century
A, W, Sp. 5 cl.
Prereq.: Either 104, 163, or equiv.
Students are advised to register also for 203 and 204.
Not open to student with credit for 227.
Readings from representative authors such as Mann, Schnitzler, Duerenmatt.

222 (576) U 5
Introduction to German Literature: The 19th Century
A, W, Sp. 5 cl.
Prereq.: Either 104, 163, or equiv.
Students are advised to register also for 203 or 204.
Not open to students with credit for 226.
Readings from Brentano, Hoffmann, Storm, and Keller.

223 (575) U 5
Introduction to German Literature: The Classical Period
A, W, Sp. 5 cl.
Prereq.: Either 221, 222, or equiv.
Students are advised to register also for 203 and 204.
Not open to students with credit for 225.
Readings from Goethe and Schiller.

260 U 3
Early German Literature in Translation
Sp. 3 cl.
Credit does not apply toward a major in German.
Trends in German literature of the Middle Ages, the Renaissance and the Reformation as reflected in representative literary monuments. Bekker.

261 U 3
German Classics in Translation
A. 3 cl.
Not for credit on a major in German.
Social and intellectual forces in Germany as reflected in German literature from the Enlightenment to the middle of the 19th century; masterpieces from Goethe to Gottfried Keller. Sedlin.

262 U 3
Modern German Literature in Translation
W. 3 cl.
Not for credit on a major in German.
Intellectual forces and literary trends in German literature from the end of the 19th century to the present; masterpieces from Gerhart Hauptmann to Bertolt Brecht. Hoffman.

361+ (571) U 3
German Civilization I
A. 3 cl.
Taught in Engl.
The cultural heritage of the German people from the beginning to about 1500; institutions, phases of civilization, interrelationship of social and literary history. Haas.

362+ (572) U 3
German Civilization II
W. 3 cl.
Taught in Engl.
German civilization from Luther to the Age of Goethe; cultural trends, social changes, historical development to the end of the Holy Roman Empire. Haas.

409 U 3
Advanced German Conversation
W. 3 cl.
Prereq.: 203.

463+ U 3
German Civilization III
Sp. 3 cl.
Prereq.: 10 cr. hrs. in 200-level courses in German with the exception of 260, 261, and 262.
Taught in German.
Intellectual, artistic, and social trends in the German speaking countries from 1815 to the present.
571 (499) G 5
Basic German for Graduate Students
Su, A, W, Sp.  5 cl.
Prereq.: Grad. standing.
Credit does not apply to the minimum hours required for the Master's or doctoral degrees. No audit.
The fundamentals of German grammar, as required for the reading of German texts in the sciences and humanities. Gottwald.

572 (501) G 3
German for Research I
Su, A, W, Sp.  3 cl.
Prereq.: Grade of C or above in 571 or equiv. preparation demonstrated by a placement test.
Open only to graduate students. Credit does not apply to the minimum hours required for the Master's or doctoral degrees. No audit.
Repeatable twice.
Satisfactory completion of this course (grade of A or B) will be accepted as evidence of a dictionary reading knowledge in fulfillment of Ph.D. language requirement. Gottwald.

573 G 3
German for Research II
Su, W.  3 cl.
Prereq.: Grade of A or B in 572, or equiv. preparation demonstrated by a placement test and permission of instructor.
Open only to graduate students. Credit does not apply to the minimum hours required for the Master's or doctoral degrees. No audit.
Reading of difficult material at a reasonable rate of speed and with only infrequent use of dictionaries.
Completion of this course with a grade of A or B will be accepted as evidence of a thorough reading knowledge of German. Gottwald.

GENERAL PREREQUISITES FOR COURSES
NUMBERED 600
Unless otherwise indicated, the prerequisites for 600-level courses are: a minimum of 10 hours of 221, 222, 223, plus a minimum of 5 hours of 203, 204, 205, 211. Exceptions may be allowed by instructors for students with special qualifications.

605* (705) U G 3
Introduction to the Study of Language
Sp.  3 cl.
Elements of linguistics with emphasis on the historical study of languages and on semantics; the position of Germanic in the Indo-European family of languages.

606* (656) U G 3
Introduction to the Historical Study of German
Sp.  3 cl.
The historical development of the German language, with a short survey of the Germanic languages; internal and external influences which have determined its characteristics (phonology, morphology, and vocabulary). Beikin.

611 U G 3
Medieval German Literature
A.  3 cl.
Survey of German literature from the 8th century to the end of the Middle Ages. Beikin.

612 U G 3
Literature of Humanism, Reformation, and Baroque
W.  3 cl.
Survey of German literature from 1400 to 1600. Seidlin.

621 (665) U G 3
The German "Novelette"
A.  3 cl.
Reading and analysis of masterpieces of the 19th and 20th centuries: Kleist, Eichendorff, Stifter, Keller, and Thomas Mann. Seidlin.

622 (662) U G 3
The German Drama
W.  3 cl.
Reading and analysis of masterpieces of the 19th and 20th centuries: Schiller, Kleist, Grillparzer, Hebbel, and Brecht.

623 (663) U G 3
German Lyrics
Sp.  3 cl.
Analysis of German lyrics from 1200 to the present; study of specific forms: Volkslied, ballad, sonnet, and individual great lyricists. Hoffmann.

630 (685) U G 3
Advanced German Composition
W, Sp.  3 cl.
Prereq.: 205, 211, or permission of instructor.
Composition on assigned topics and practice in translation. Haas.

635 (691) U G 3
Practical German Pronunciation
A.  2 2-hr. cl.
Prereq.: Permission of instructor.
Standard German pronunciation; oral and written drill. Fleischhauer.

650 U G 1 or 3
Proseminar
Su, Sp.  3 cl., 3 cr. hrs.
Su (1st term).  3 cl., 1 cr. hr.
Prereq.: Permission of chairman.
Repeatable to a maximum of 24 cr. hrs.

660† U G 3
Masterpieces of German Literature
Su.  3 cl.
Prereq.: Permission of chairman.
Repeatable to a maximum of 18 cr. hrs.
Selections from works of major German writers; topic varies each year.

693 (701) U G 2-5
Individual Studies in German
Prereq.: Permission of chairman.
Repeatable to a maximum of 30 cr. hrs.
Investigation of minor problems in the various fields of German literature and philology.
### GERMAN

#### 694  U 2-5
**Group Studies in German**
- **Sr., A, W, Sp.**
- **Prereq.:** Permission of chairman.
- **Repeatable to a maximum of 30 cr. hrs.**
- Investigation of minor problems in the various fields of German literature and philology.

**GENERAL PREREQUISITES FOR COURSES**
- **NUMBERED 700**
- Prerequisites for 700-level courses are graduate standing, or 4th yr. standing with 9 cr. hrs. in German at the 600-level, and permission of chairman.

#### 721*  U 4
**German Literature of the 18th Century**
- **A.** 4 cl.
- *The literature of the Enlightenment and Storm and Stress; Lessing, Klopstock, Wieland, young Goethe, and Schiller.*

#### 722*  U 4
**German Classical Literature**
- **W.** 4 cl.
- Goethe's and Schiller's major works and their significance for modern times. Seidlin.

#### 723*  U 3
**Goethe's Faust**
- **Sp.** 3 cl.
- History of the Faust legend from the 16th century to Goethe; reading and discussion of the play.

#### 724†  U 4
**German Romanticism**
- **A.** 4 cl.
- *The romantic revolt against the ideas of classicism; Novalis, the Schlegels, Tieck, Kleist, Eichendorff, and E. T. A. Hoffmann.* Seidlin.

#### 725†  U 4
**German Literature of the 19th Century**
- **W.** 4 cl.
- Literary forces and trends from Goethe's death to the founding of the German Reich (Grillparzer, Buechner, Hebbel, Raimund, Moerihe, Stirte, Keller, and Meyer).

#### 726†  U 4
**Modern German Literature**
- **Sp.** 4 cl.
- Main currents of German thought and literature from Nietzsche to the present; Hauptmann, Schnitzler, Mann, Rilke, George, Hofmannsthal, Kafka, and Brecht. Hoffmann.

#### 730  U 3
**Advanced Stylistics**
- **W.** 3 cl.
- **Prereq.:** Grade of A in 630, or permission of instructor.
- Stylistic analysis on an advanced level of German prose; compositions, reports, and discussion. Vitt.

#### H783  U 3-5
**Honors Course**
- **W, Sp.** 2.1/2-hr. cl.
- **Prereq.:** 4th yr. standing with a grade of A in at least half of the Ger. courses and an average of 8 in the remainder, and permission of chairman and the Honors Committee of the Colleges.
- **Repeatable to a maximum of 15 cr. hrs.**
- Offers undergraduates with special aptitudes a greater opportunity to do independent study than is possible in the ordinary course. Schmidt.

**GENERAL PREREQUISITES FOR COURSES**
- **NUMBERED 800**
- Prerequisites for 800-level courses are graduate standing and permission of chairman.

#### 800  G 3
**Bibliography and Method**
- **A.** 2 cl.
- Required of all candidates for grad. degrees.
- The tools, problems, and methods of literary research. Belkin.

#### 801†  G 4
**Middle High German**
- **A.** 4 cl.
- Middle High German texts; methods of textual criticism. Fleischhauer.

#### 802† (805)  G 4
**Old Saxon and Old High German**
- **W.** 4 cl.
- Readings from the Helian and selected Old High German texts. Fleischhauer.

#### 803† (810)  G 3
**Gothic**
- **Sp.** 3 cl.
- Readings from the Bible; Gothic as a basis for the comparative study of the Germanic languages and historical German phonology and morphology. Fleischhauer.

#### 806† (815)  G 3
**History of the German Language**
- **W.** 3 cl.
- **Prereq.:** 801.
- Basic concepts of historical linguistics; the major factors of change in the history of German from Proto-Germanic to the present. Fleischhauer.

#### 821*  G 3
**History of German Literature Until 1700**
- **A.** 3 cl.
- Readings from the earliest period to the end of the 17th century. Belkin.

#### 822*  G 3
**History of German Literature Until 1700**
- **W.** 3 cl.
- Continuation of 821. Bekker.
Greek

Office: 217 Derby Hall, 104 North Oval Drive

Professors Morford (Chairman), Abbott, Babcock, Forbes, and Titchener (Emeritus); Associate Professors Cleary and Lenardon; Assistant Professors Davis, Hahn, Schlam, Shumaker, and Snyder; Adjunct Assistant Professor Drachman.

See Classics also.

101 (401) U 5
Elementary Greek
A. 5 cl.
Credit in 101 will count toward graduation only if followed by successful completion of 102, or if taken after successful completion of the fourth regular University course in another foreign language.
Snyder.

102 (402) U 5
Elementary Greek
W. 5 cl.
Prereq.: 101.
Snyder.

103 (403) U 5
Intermediate Greek Reading
Sp. 5 cl.
Prereq.: 102.

112 (415) U 5, 10, 15
Intensive Introduction to Greek
Su. 10 cl. and 10 or more hrs. of supervised study.
Full time of student and full fees required.
Equiv. of 101, 102 and 103. Students with credit for 101 or the equiv. may not register for more than 10 cl. hrs. Students with credit for 101 and 102 or the equiv. may not register for more than 5 cl. hrs. Students with credit for 103 or the equiv. may not register for credit.

210† (506) U 5
New Testament Greek
A. 5 cl.
Prereq.: 103 or 112.
Intended primarily for pre-theological students.

221 U 5
Attic Prose
A. 5 cl.
Prereq.: 103 or 112.
Shumaker.

222 (607) U 3
Euripides
W. 3 cl.
Prereq.: 210 or 221.
Not open to students with credit for 202.
Homer
Sp. 3 cl.
Prereq.: 210 or 221.
Not open to students with credit for 200.
Schlam.

Demosthenes
Sp. 3 cl.
Prereq.: 2 courses at 200 level.
Morford.

Herodotus
A. 3 cl.
Prereq.: 2 courses at 200 level.
Not open to students with credit for 201 except by permission of chairman.
Hahn.

Aristophanes
W. 3 cl.
Prereq.: 2 courses at 200 level.

Sophocles
W. 3 cl.
Prereq.: 2 courses at 200 level.
Schlam.

Thucydides
Sp. 3 cl.
Prereq.: 2 courses at 200 level.

Plato
Sp. 3 cl.
Prereq.: 2 courses at 200 level.

Greek Prose Composition
Sp.
Prereq.: At least 1 course at 500 level.
Shumaker.

Post-Hellenistic and Early Byzantine Greek
Sp.
Prereq.: 2 courses at 200 level.

Individual Studies in Greek
Prereq.: 2 courses at 600 level, or permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Passages for reading and topics for investigation will be selected to meet the needs of individual students.
Health Education


Professors: Cushman (Chairman), Beyrer, and Kaplan; Associate Professor Fogle; Assistant Professor Grosshans; Instructors Abbott, Brower, Matson, and Olshman.

101 (400) U 1
Hygiene
Su, A, W, Sp. 1 cl., 1 lab. hr.
Required of all freshmen except those who take 103 or 200.
Not open to majors or minors in Phys. Ed., and Dent.
Hyp. Ed.
Designed to influence knowledge, attitudes, and behavior related to individual health.

102 (473) U 1
First Aid
Su, A, W, Sp. 2 cl., lab.
A consideration of first aid practices to the injured; completion leads to Red Cross certificates in first aid.

103 U 3
Health for the College Student
Su, A, W, Sp. 3 cl.
Not open to students with credit for 101 or 200.
May be substituted for Health Ed. 101 to fulfill University requirement.
A study of student health problems; designed to foster understandings and attitudes needed for intelligent decision-making related to present and future health needs.

200 (510) U 5
Hygiene
A, W, Sp. 5 cl.
Not open to students with credit for 103.
Designed to establish a basis for positive health and efficiency through a consideration of various conditions and factors which affect health.

201 U 3
Current Concepts in Community Health
Sp. 3 cl.
Prereq.: 101 or equiv.
A study of community health programs; the need for them, the problems and issues involved, and how these problems can be solved.

300 (609) U 3
Health Education for Elementary Teachers
Su, A, W, Sp. 3 cl.
Prereq.: 101 or equiv., and Psychol. 230.
Not open to undergraduate minors or majors in Phys.
Ed., or Health Ed.
The teacher's responsibility for health of school child; screening, referral, vision and hearing, nutritional problems, instructional programs, emergency care, teacher's health.
Health Education for Secondary Teachers
Su, A, W, Sp.  3 cl.
Prereq.: 101 or equiv., Psychol. 230 and Ed. 435.
Not open to students preparing for secondary school teaching.
A study of health problems as they relate to the
different secondary school students; emphasis on the
role of the teacher in the secondary school health
program.

Safety Education
W.  3 cl.
Prereq.: 102.
The study of the epidemiology of accidents, development of
preventive programs and safety consciousness; the
teaching of first aid to meet Red Cross instructors
requirements. Matson.

The School Health Program
W.  5 cl.
A consideration of the total school health program
including healthful school living, health services, and
the teaching of health.

Group Studies in Health Education
Sp.  2 cl.
Prereq. or concur.: Ed. 587, 24
Sp. only to Phys. Ed. majors.
Consideration of present and changing concepts of
health education in schools and society.

Personal Health Problems
Su, A.  3 cl.
An advanced course in personal health problems;
extensive reading and reporting in selected health
areas. Cushman and Beyrer.

Current Progress in Disease Control
Sp.  2 cl.
Prereq.: 4th yr. grad. standing in a health science area.
Authorities in medicine and health sciences will
interpret how current findings may affect disease
prevention and control; newer knowledge of cancer,
dental care, etc., will be discussed. Cushman and
Fogle.

Education for Human Sexuality
Su, W.  3 cl.
Prereq.: 200 or equiv., Sociol. 330, and permission
of instructor.
Review of current information on health and sexuality
by educators and school personnel; consideration of
the sex education curriculum, teaching methods,
materials, and controversial issues. Kaplan.

School Health Services
Su, A, W.  3 cl.
Prereq.: 200 or equiv.
Consideration of healthful school living and health
services, including health appraisal, counseling,
educational adjustments, communicable diseases, and
emergency programs. Cushman.

The Teaching of Health
Su, W, Sp.  5 cl.
Prereq.: 621.
Not open to students with credit for 630.
Principles, methods, materials, and resources involved
in teaching health; direct, correlated, and integrated
curriculum patterns; individual teaching experience.
Cushman, Beyrer, and Kaplan.

Organizational Relationships
in School Health Education
Su, W, Sp.  3 cl.
Prereq.: 622.
Not open to students with credit for 620.
The relation of the school health program to the total
community health program; official and non-official
health agencies are studied. Beyrer.

School Health Education Workshop
Su.  3 wk. workshop.
Prereq.: Permission of instructor.
Repeatable to a maximum of 8 cr. hrs.
A team approach to school health education with
emphasis on instruction, health services, environment,
methods, materials, resources, evaluation,
interrelationships, etc.; individual and group study,
Fogle.

Individual Studies in Health Education
Prereq.: 4th yr. or grad. standing and permission of
adviser.
Investigation of selected professional problems.

Group Studies in School Health Education
Advanced problems in school health education;
individual or group participation.

Curriculum in Health Education
A.
Beyrer.
Survey of Research in Health Education
W.
Beyrer.
Evaluation in Health Education
Sp.
Cushman.

Seminar in School Health Education
A.  2 cl.
Beyrer and Cushman.
996  G 3
Comparative Study of World Health Problems
W. 3 cl.
Prereq.: 102, 200, or 501.
A study of world health problems, their influences on
all people, the variety and magnitude of problems, and
the methods being used to solve them. Kaplan.

999  (950)  G Arr.
Research in Health Education
Research for thesis and dissertation purposes only.

Hebrew

Office: 248 Dieter Cunz Hall of Languages, 1841 Millikin
Road
Professor Bulatkin Chairman; Assistant Professors
Mashiah and Hayon.

101  U 5
Elementary Hebrew
A, W, Sp. 5 cl.
Conversation, reading, writing, vocabulary building,
phonetics, and grammar.

102  U 5
Elementary Hebrew
A, W, Sp. 5 cl.
Prereq.: 101.
Reading of modified passages from modern Hebrew
literature supplemented with additional study of
grammar.

103  U 5
Intermediate Hebrew
A, W, Sp. 5 cl.
Prereq.: 102.
Reading of passages from various periods of Hebrew
literature; review of salient points of elementary
grammar and introduction to elements of classical
Hebrew.

104  U 5
Intermediate Hebrew
A, W, Sp. 5 cl.
Prereq.: 103.
Reading of modern Hebrew short stories, poems, and
essays; special emphasis on oral practice and Hebrew
idioms.

112  U 5, 10, 15
Intensive Modern Hebrew
Su. 15 cl. Enrollment limited to 25 students.
Prereq.: Permission of chairman.
Full time of student and full fees required.
Equiv. of 101, 102, 103. Students with credit for 101 or
the equiv. may not register for more than 10 hrs.
Students with credit for 101 and 102 or the equiv. may
not register for more than 5 hrs. Students with credit
for 103 or the equiv. may not register for credit.

231  U 3
Introduction to Modern Hebrew
Literature in English
Sp. 3 cl.
Prereq.: Permission of instructor.
Modern Hebrew literature: works of major writers
from the middle of the 18th century to the present;
emphasis on European literary influences.

401  U 5
Review Grammar and Composition
A. 5 cl.
Prereq.: 104.
Review of Hebrew grammar; composition on assigned
topics and some practice in translation.

402  U 5
Intermediate Hebrew Conversation
and Composition
W. 5 cl.
Prereq.: 401 or permission of instructor.
Vocabulary building, practice in speaking Hebrew,
conversation and composition dealing with social and
everyday aspects of Israeli life.

421  U 3
The Modern Hebrew Short Story
A. 3 cl.
Prereq.: 104.
Reading and discussion of masterpieces of modern
Hebrew short stories in the 19th and 20th centuries.

422  U 3
Modern Hebrew Poetry
W. 3 cl.
Prereq.: 421 or permission of instructor.
Reading and discussion of masterpieces of modern
Hebrew poetry in the 19th and 20th centuries.

604  U 3
Hebrew Phonetics and Vocalization
Sp. 3 cl.
Prereq.: 104 or permission of instructor.
Rules of Hebrew phonetics and vocalization; lectures
and abundant practical exercises.

694  U G 1-15
Group Studies in Hebrew
Prereq.: Permission of instructor.
Repeatable to a maximum of 30 cr. hrs.

793  U G 1-5
Individual Studies in Hebrew
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.

794  U G 1-15
Group Studies in Hebrew
Prereq.: Permission of instructor.
Repeatable to a maximum of 30 cr. hrs.
History

Office: 108 University Hall, 216 North Oval Drive

Professors Coles (Chairman), Anker, Bremer, Burnham, Chapin, Chu, Dillon, Doralpen, Dullas (Emeritus), Fisher, Grimm, Hill (Emeritus), L., McDonald (Emeritus), Morley, Pegues, Poitier, Ragatz (Emeritus), Roberts, Roseboom (Emeritus), Rule, Simms (Emeritus), Weisenburger, Woodring (Emeritus), and Young; Associate Professors Chang, Cooper, Curran, Fullimer, Millett, and Zahniser; Assistant Professors Bowers, Chazan, Eckes, Hare (Emeritus), Hodgson, Kern, Minear, Reinhardt (Lima), and Rogel.

101   (401)   U 5
History of Western Civilization, 1500 to 1815
Su, A, W, Sp.  5 cl.
Either 101 or 102 may be taken independently.
Not open to students with credit for 121.
Renaissance; Reformation; Spanish culture; Elizabethan England; French classicism, and early modern natural science; national monarchies, absolutism, and mercantilism; the Enlightenment; the French Revolution; Napoleon.

102   (402)   U 5
History of Western Civilization, 1815 to Present
Su, A, W, Sp.  5 cl.
Either 101 or 102 may be taken independently.
Not open to students with credit for 122 or 123.
Continuation of 101. Restoration; reaction; democracy; economic and political nationalism; Romanticism; nationalism; imperialism; World War I; post-war Europe.

103  (403)  U 5
History of the United States, 1763 to 1877
Su, A, W, Sp. 5 cl.
Not open to students with credit for 121 or 122 or 230.
The general political, constitutional, and economic development of the United States from the beginning of the Revolutionary era to the end of the Civil War.

104  (404)  U 5
History of the United States, 1877 to Present
Su, A, W, Sp.  5 cl.
Not open to students with credit for 122, 123, or 230.
A continuation of 103; the two provide a sequence but either may be taken independently as an elective.

121  (421)  U 5
The Western World in Modern Times
Su, A, W, Sp.  5 cl.
H121 (honors) may be available to students enrolled in a college honors program or by permission of dept.
Not open to students with credit for 101, 103, or 230.
From the beginning of modern times through the first third of the 20th century; history of modern Europe and the United States; emphasis onhistory of the United States in a world setting; major themes include development of a representative government and democracy, rise of capitalism, role of organized religion, and the impact of scientific development.

122  (422)  U 5
The Western World in Modern Times
Su, A, W, Sp.  5 cl.
H122 (honors) may be available to students enrolled in a college honors program or by permission of dept.
Not open to students with credit for 102, 103, 104, or 230.
Continuation of 121; the 19th century.

123  (423)  U 5
The Western World in Modern Times
Su, A, W, Sp.  5 cl.
H123 (honors) may be available to students enrolled in a college honors program or by permission of dept.
Not open to students with credit for 102, 104, or 230.
Continuation of 122; the 20th century.

210  (511)  U 3
Great Figures in Greek and Roman Antiquity
A.  3 cl.
A biographical approach to Antiquity through an examination of the lives of eight prominent men; readings in ancient and modern biographies. St. Clair.

211†  (512)  U 3
Great Figures of Modern Europe
A.  3 cl.
A study of modern European history through an examination of the lives and times of great figures. Rule.

212  (510)  U 3
Great Figures in British History
W.  3 cl.
British history since 1485 as illustrated in the lives of notable figures. Roberts.

213  (517)  U 3
The History of the Medieval Church
W.  3 cl.
The rise of the Christian church and the papacy; the Church Fathers; investiture controversy; heresy and monasticism; mysticism; the crisis of the late medieval church, Purgies.

215  (590)  U 5
Contemporary Europe, 1914 to Present
A.  5 cl.
World War I, political, social, and economic developments of the interwar period; Communism, Nazism; World War II; Europe between East and West; moves toward unification. Doralpen.

220  (520)  U 5
Russian Civilization
W.  5 cl.
A survey of Russian civilization from earliest times to 1917; geography, peoples, culture, social, political and religious institutions, and the impact of Westernization. Curran.
American Civilization
Sp. 5 cl.
Not open to students with credit for 103, 104, 121, 122, or 123.
A survey emphasizing the origin and development of basic ideas and institutions, continuing problems of American democracy, and the U.S. and world affairs. Coles.

Great Figures in American History
A, W, Sp. 3 cl.
Main trends of American development through the medium of biography; historical background, comparison and contrast of leading figures, and analysis of motivation and character. Bowers, Coles, and Hodgson.

Recent History of the United States, 1898-1928
W. 5 cl.
Not open to students with credit for 104 or 123.
Not to count toward a major in Hist.
The impact of modern industrialism upon American imperialism, society, government, and foreign policy; laissez-faire and government regulation, the Progressive movement, and the First World War.

Recent History of the United States, Since 1928
Sp. 3 cl.
Not open to students with credit for 104 or 123.
Not to count toward a major in Hist.
Continuation of 232, but may be taken separately.
Continuation of 232, but may be taken separately.
The history of the United States in international affairs, and the Second World War.

Latin America in the 20th Century
W. 3 cl.
The history of Latin America in the 20th century. Stoan.

Jewish Civilization I
A. 3 cl.
Either 251, 252, or 253 may be taken independently.
Jewish and Judaism from remote antiquity to the 4th century A.D. Ankori.

Jewish Civilization II
W. 3 cl.
Either 251, 252, or 253 may be taken independently.
Jewish and Judaism from the 4th century A.D. to the French Revolution. Chazan.

Jewish Civilization III
Sp. 3 cl.
Either 251, 252, or 253 may be taken independently.
Jewish and Judaism from the French Revolution to the present. Chazan.

American Negro History
A. 3 cl.
The Negro in North America from the 16th century to the present.

History of East Asia to 1800
A. 5 cl.
Not open to students with credit for 644.
East Asian civilization from the earliest time to 1800: Confucianism, Buddhism, Taoism; the Chinese high culture; the regional variations—Japan, Korea, and Vietnam. Chang and Minear.

History of East Asia Since 1800
W. 5 cl.
Not open to students with credit for 645.
The modernization of Asia; the impact of the West; the response of the traditional societies; nationalism, fascism, communism. Chang and Minear.

Special Topics in History
Repeatable to a maximum of 15 cr. hrs.
Groups of students are given an opportunity to pursue special studies not otherwise offered.

Major Influences in the History of Western Civilization
W. 2 cl.
Offered by senior members of the staff and designed to acquaint the student with problems in the interpretation of the history of western civilization. Rule.

Honors Proseminar in History
Prereq.: Honors section of 123 or 15 cr. hrs. of 100-200 level Hist. courses with an average of 3.2 or better.
Students may not register for more than 2 decimal subdivisions below in any one quarter; no more than 12 cr. hrs. may be counted toward graduation; no more than 9 cr. hrs. may be counted toward the major in Hist.
Repeatable to a maximum of 15 cr. hrs.
Designed to give undergraduates experience in historical research and analysis of historical problems.

United States History

West European History

East European History

Asian History

Other Areas

GENERAL PREREQUISITES FOR COURSES
NUMBERED 600 AND 700
Unless otherwise indicated the prerequisites for 600 and 700-level courses are four quarter courses in the social science field, of which at least two must be in history.
Not open to freshmen and sophomores except with permission of instructor.
600* (653) U G 3
The Ancient History of the Near East
W. 3 cl.
The ancient history of Egypt, Babylonia, Assyria, and
adjacent cultures; readings in the sources in
translation. St. Clair.

601 (655) U G 5
Greek History
Sp. 5 cl.
A history of Greece from the early Minoan period to the
age of Demosthenes and Philip of Macedon; readings
in the Greek historians in translation.

602* (649) U G 3
Greek Civilization
A. 3 cl.
The Hellenistic Age: A study of Greek institutions from
Alexander the Great to the Roman conquest; readings
in the sources in translation.

603 (656) U G 5
Roman History
A. 5 cl.
A history of Rome from the early Bronze Age to the
fall of the Roman Republic; readings in the Roman

604* (650) U G 3
Roman Civilization
W. 3 cl.
A study of the Early Roman Empire, beginning with
the Augustan Age and ending with Marcus Aurelius;
readings in the sources in translation. St. Clair.

606 (619) U G 5
Medieval Civilization
A. 5 cl.
The decline of the Roman Empire; the rise of
Christianity; analysis of feudalism and manorialism;
the Great Economic Revival, and the origins of Western
Society. Pegues.

609 (607) U G 3
The Renaissance
W. 3 cl.
The literary, artistic, and intellectual achievements
primarily of Renaissance Italy against the economic,
political, and social developments in western Europe.
Grimm and Pegues.

610 (608) U G 5
The Reformation
Sp. 5 cl.
The rise and growth of Protestantism and the Catholic
reformation of the 16th century against the economic,
political, and social developments in Western Europe.
Grimm.

612 (617) U G 5
Europe, 1680-1789
Su. 5 cl.
A study of the rise of the absolute state, the changing
diplomatic alignments, and the enlightenment. Rule.

613 (624) U G 5
The French Revolution and Napoleon
A. 5 cl.
The background of the Revolution; the social bases and
political schisms of the first three Revolutionary
governments, 1789-1795; the program and role of
Napoleon. Rule.

614 (620) U G 5
Europe, 1815-1914
W. 5 cl.
Nationalism, the democratic movement, economic
growth, imperialism, and cultural advance from the
Congress of Vienna to World War I. Pogel.

615 (629) U G 5
France, 1815-1914
A. 5 cl.
France's transformation from a rural, traditional society
to a modern, industrial society, and the relation of this
transformation to 19th century political and intellectual
movements. Rothney.

618 (620) U G 5
France in the 20th Century
W. 5 cl.
The impact on France of two world wars, the depression
and decolonization, with emphasis on the breakdown
of the political system and the emergence of a new
society from the wreckage of the old. Rothney.

618 (629) U G 5
Modern Germany, 1815 to Present
Su. A. 5 cl.
Political, social, economic, and cultural developments;
the national and liberal movements; unification;
Empire; Weimar Republic; Nazi Regime; present-day
Germany. Dorrpelen and Gates.

618 (629) U G 5
Rise of Modern Physical Science, 1500-1778
A. 5 cl.
Prereq.: Jr. standing.
The history of the physical sciences, 1500-1778. Fullmer.

620 (630) U G 3
European Diplomacy, 1871-1939
W. 3 cl.
Imperialism and the Alliance systems leading to
World War I; the Paris Peace Conference, and the
political and economic diplomacy prior to World War
II. Fisher.

621 U G 5
The Rise of Modern Physical Science, 1779-1904
W. 5 cl.
Prereq.: Jr. standing.
The physical sciences from the end of the
Enlightenment to 1904 and their intellectual and
institutional interrelationships with Western society.
Fullmer.

622 (687) U G 5
Intellectual History of 19th Century Europe
Su. 5 cl.
Ideas and ideologies in their social and economic
setting, including laissez-faire liberalism, Darwinism,
and the various schools of socialism. Poirier.
623 U G 5
Economic History of Modern Europe, 1700-1840
W. 5 cl.
Factors of pre-industrial economic growth, economic policies of the European states, evolution of economic thought, the first Industrial Revolution and its effects on European society. Gates.

624 U G 5
Economic History of Modern Europe, 1840 to Present
Sp. 5 cl.

628 (622) U G 5
Africa and the Western World in the 19th and 20th Centuries
W. 5 cl.
Economic penetration, the conflict of cultures, political developments, and social advance.

629† (623) U G 5
Asia, the Pacific Basin, and the Western World in the 19th and 20th Centuries
W. 5 cl.
The rise and decline of imperialism and contemporary problems.

630 (609) U G 5
Medieval England
Sp. 5 cl.
England from the Roman conquest to 1485; Anglo-Saxon society and institutions; the Norman conquest; law and parliament; social, intellectual, and economic growth of the English people. Pagues.

631 U G 5
Tudor and Stuart England
Sp. 5 cl.
The religious, political, economic, imperial, and intellectual development of the English people from 1485 to 1714, with special attention to the constitutional struggles of the 17th century. Roberts.

632 (610) U G 5
England in the 18th and 19th Centuries
Su. 5 cl.
The course of political, social, and intellectual change, of industrial and commercial growth of Hanoverian, Victorian, and Edwardian England. Poirier.

633 (686) U G 5
England in the 20th Century
Sp. 5 cl.
A study of Britain since 1900 with special emphasis on the rise of the Labour party and the development of the social welfare state. Poirier.

635 (675) U G 3
History of Russia, to 1801
A. 3 cl.
A survey from the origins of the Russian state to the end of the 18th century. Curran.

636 (676) U G 3
History of Russian, 1801-1914
W. 3 cl.
A survey from the accession of Alexander I to the outbreak of the First World War. Morley.

637 (677) U G 3
Soviet Russia
Su, A, Sp. 3 cl.
Beginning with the background and events of the revolution of 1917, this course analyzes developments in Russian history from World War I to the present. Morley and Curran.

638 (681) U G 5
Russian Intellectual History
Su, Sp. 5 cl.
A survey of the main currents of Russian social, political, economic, and philosophical thought in the 19th century; Liberalism, Conservatism, and Socialism. Curran.

639* (678) U G 3
Modern Poland
Sp. 3 cl.
While several background lectures deal with the partitions of Poland and the revolutions of the 19th century, emphasis is placed on the period since 1918. Morley.

641 (626) U G 3
The Rise of Islam and the Spread of Muslim Civilization
A. 3 cl.
Life and teachings of Muhammad; Umayyad and Abbasid empires; the Crusades, Islamic culture and learning through the ages; the decline under the Mongols; terminal date, 1517. Fisher.

642 (627) U G 3
The Rise and Fall of the Ottoman Empire
W. 3 cl.
A study of the significance of the Middle East with respect to Europe from the 13th century to World War I. Fisher.

643 (628) U G 3
The Middle East Since 1914
Sp. 3 cl.
National and international problems following the collapse of the Ottoman empire; the Turkish Republic; the state of Israel; Arab unity; and the conflict between East and West. Fisher.

647 U G 5
History of Traditional Japan
W. 5 cl.
Prereq.: 265 or permission of instructor. Problems regarding the political, intellectual, and institutional history of Japan prior to the arrival of Perry (1851). Minear.
648 (651) U G 5
History of Modern Japan
Sp. 5 cl.
Prereq.: 266 or permission of instructor.
Political, social, and intellectual history of Japan from the beginning of the Meiji Period (1868) to the present. Minnert.

650† (649) U G 5
Spain
Sp. 5 cl.
The unification of Spain under Ferdinand and Isabella; the Golden Age; Enlightened Despotism of the 18th century; the Napoleonic Wars; the Generation of 1898; the Republic and the Civil War; the regime of Francisco Franco. Stoan.

651 (645) U G 5
Latin America
Su. A. 5 cl.
The Mayan, Aztec, and Inca Empires; the Spanish and Portuguese conquest; and the development of Hispanic civilization in the New World. Cooper and Stoan.

652 (646) U G 5
South America Since Independence
Su. W. 5 cl.
Nation-building in the South American republics during the 19th and 20th centuries with special emphasis upon Argentina, Uruguay, and Brazil. Cooper and Stoan.

653 (679) U G 5
Northern Latin America Since Independence
Sp. 5 cl.
Special emphasis upon social and economic outcomes of the main revolutionary movements. Cooper.

654† (654) U G 5
Intellectual History of Latin America in the National Era
W. 5 cl.
Prereq.: 6 cr. hrs. of 600-level courses in the Latin America area or permission of instructor.
A study of the impact of thought upon the organization of Latin American society in different epochs.

655 U G 5
Social and Economic History of Latin America in the National Era
A. 5 cl.
Prereq.: 6 cr. hrs. of 600-level courses in the Latin America area or permission of instructor.
A study of patterns in the history of race, class, land, industry, and foreign influence. Cooper.

656 (544) U G 5
The American Colonies
A. 5 cl.
The transplanting of European civilization to North America, the resultant international rivalries, and the political, social, and economic life of the English colonies to 1763. Bowers, Chapin, and Coles.

658 (648) U G 5
The American Revolution and New Nation, 1763-1800
Sp. 5 cl.
A continuation of 656 but may be taken separately; primary emphasis on social, intellectual, and economic factors. Bowers, Chapin, Coles, and Zahriser.

659 U G 5
Jefferson and Jacksonian Democracy, 1800-1840
Su. 5 cl.
A continuation of 658 but may be taken separately. Primary emphasis on ideological, cultural, and political factors. Bowers, Chapin, Coles, and Hodgeson.

660 (641) U G 5
The Westward Movement Since 1783
Su. 5 cl.
The westward spread of settlement and the influence of the westward movement on American development. Young.

661 (633) U G 3
The Slavery Controversy in the United States
A. 3 cl.
The social system of the Old South; the various aspects of the controversy; secession and the impact of war. Dillon.

662 (634) U G 3
Reconstruction and the New South, 1863 to Present
W. 3 cl.
The controversy over reconstruction; the social and economic readjustments in Southern states during and after reconstruction. Dillon.

664 (668) U G 5
The Emergence of Modern America, 1865-1898
Sp. 5 cl.
An intensive study of the political, social, and cultural transformation of the United States in the late 19th century. Weisenburger.

665 U G 3
United States in the 20th Century, 1910-1919
A. 3 cl.
Prereq.: 123 or 104.
Open to grad. students by permission of instructor. An intensive study of the United States during the Progressive Era and World War I. Bremner, Burnham, and Kerr.

666 U G 3
United States in the 20th Century, 1920-1939
Su. W. 3 cl.
Prereq.: 123 or 104.
Open to grad. students by permission of instructor. An intensive study of the United States during the Era of Normalcy and the New Deal. Bremner and Burnham.
648 (651) U G 5
History of Modern Japan
Sp. 5 cl.
Prereq.: 266 or permission of instructor.
Political, social, and intellectual history of Japan from the beginning of the Meiji Period (1868) to the present. Minear.

650 U G 5
Spain
Sp. 5 cl.
The unification of Spain under Ferdinand and Isabella; the Golden Age; Enlightenment Despotism of the 18th century; the Napoleonic Wars; the Generation of 1898; the Republic and the Civil War; the regime of Francisco Franco. Stoan.

651 (645) U G 5
Latin America
Su. A. 5 cl.
The Mayan, Aztec, and Inca Empires; the Spanish and Portuguese conquest; and the development of Hispanic civilization in the New World. Cooper and Stoan.

652 (646) U G 5
South America Since Independence
Su. W. 5 cl.
Nation-building in the South American republics during the 19th and 20th centuries with special emphasis upon Argentina, Uruguay, and Brazil. Cooper and Stoan.

653 (679) U G 5
Northern Latin America Since Independence
Sp. 5 cl.
Special emphasis upon social and economic outcomes of the main revolutionary movements. Cooper.

654 U G 5
Intellectual History of Latin America in the National Era
W. 5 cl.
Prereq.: 6 cr. hrs. of 600-level courses in the Latin America area or permission of instructor.
A study of the impact of thought upon the organization of Latin American society in different epochs.

655 U G 5
Social and Economic History of Latin America in the National Era
A. 5 cl.
Prereq.: 6 cr. hrs. of 600-level courses in the Latin America area or permission of instructor.
A study of patterns in the history of race, class, land, industry, and foreign influence. Cooper.

656 (644) U G 5
The American Colonies
A. 5 cl.
The transplantsing of European civilization to North America, the resultant international rivalries, and the political, social, and economic life of the English colonies to 1763. Bowers, Chapin, and Coles.
667  U G 3
United States in the 20th Century, 1940 to Present
Su, Sp.  3 cl.
Prereq.: 102 or 104.
Open to grad. students by permission of instructor.
An intensive study of the United States during World War II and the Cold War Era. Bremner and Burnham.

668  (618)  U G 5
American Military Policy
A, Sp.  5 cl.
The development of American military policy, 1763 to the present, in relation to its political, economic, and social implications. Coles and Millett.

669  (635)  U G 5
American Foreign Policy to 1914
A, Sp.  5 cl.
Emphasis on these topics: the revolution, neutral rights, the Monroe Doctrine, continental expansion, the Civil War, overseas expansion, Far Eastern policy. Eckes and Zahniser.

670  (636)  U G 5
American Foreign Policy Since 1914
Su, W, Sp.  5 cl.
Emphasis on these topics: United States relations with Europe, Far East, and Latin America since 1914. Eckes and Zahniser.

671  (642)  U G 5
Social and Economic History of the United States, 1815-1865
A.  5 cl.
The development of economic institutions and their relation to economic growth and to movements for social and political reform. Young.

672  U G 5
Social and Economic History of the United States, 1865-1914
Su, W.  5 cl.
The development of an integrated national economy and society; its extensive and intensive expansion. Kerr and Young.

673  U G 5
Social and Economic History of the United States, 1914 to Present
Ep.  5 cl.
The development of social and economic institutions for a society characterized by high mass consumption; the increasing role of government in the economy. Young.

674  (639)  U G 5
The Influence of Immigrant Groups Upon United States History
W.  5 cl.
The study of immigrant groups in the building of the nation, from the colonial period to the present. Weisbinder.

675  U G 3
Studies in the History of Philanthropy and Social Welfare
A.  2 cl.
Prereq.: 104 or 123 or permission of instructor.
Major influences in American philanthropy and social welfare since the colonial period. Bremner.

676  U G 5
American Social Thought, 1890-1929
A.  5 cl.
Prereq.: 104 or 123.
Not open to students with credit for 692.
Philosophy and institutions of social reform in the United States in the late 19th and early 20th century. Bremner.

677  (697)  U G 5
American Social Thought Since 1929
W.  5 cl.
Prereq.: 104 or 123.
A historical examination of trends in American social thought and criticism since the Great Depression. Bremner.

678  (673)  U G 3
History of American Science Before Darwin
A.  3 cl.
Beginnings and flowering of scientific inquiry in colonial America; impact of the Enlightenment; coming of technology and expansion of science in early 19th-century America. Burnham.

679  (674)  U G 3
History of American Science Since Darwin
W.  3 cl.
The Darwinian Period in America; positivism and pragmatism; the rise of 20th-century science; American scientific leadership; role of the scientist in 20th-century America. Burnham.

680  (643)  U G 5
Political Parties in the United States
Su, W.  5 cl.
The origin and growth of national parties and the history of party struggles with emphasis upon presidential elections. Hodgson.

681  U G 3
The History of Ohio
A.  3 cl.
A general survey of state history—social, economic, religious, and political—from the Indian period to the present time. Weisbinder.

682  U P G 3
History of American Medicine
Sp.  3 cl.
Disease, public health, and the profession and practice of medicine in America from colonial times to the present. Burnham.
685 U G 5
United States Constitutional History:
The Federal System
A. 5 cl.
Historical development of constitutional powers and functions of the federal and state governments and intergovernmental relationships. Chapin.

686 U G 5
United States Constitutional History:
Rights and Immunities
W. 5 cl.
Historical development of the constitutional rights and immunities of the citizen. Chapin.

687† U G 3
United States History and the Social Sciences
Sp.
Prereq.: 20 cr. hrs. of 600-level Hist. courses.
Recent developments in the theory and practice of history as a social science using American historical materials. Bumham.

691 U G 5
Colonial Brazil, 1500-1822
W. 5 cl.
Portuguese background; discovery, exploration, and settlement; political, economic, and social development; background and achievement of independence. Cooper.

692 U G 5
Modern Brazil, 1822 to Present
Sp. 5 cl.
Independence from Portugal; the monarchical experiment; political, social, economic, and military developments; foreign relations; republican Brazil. Cooper.

693 (700) U G 1-3
Individual Studies in History
Prereq.: Permission of instructor.
Individual study in some field of historical development; designed to allow the student to work on a problem in which he is particularly interested.

694 U G 1-5
Group Studies in History
Repeatable to a maximum of 30 cr. hrs.
The investigation of particular problems in various fields of history.

695 U G 5
Classical China, 1400 B.C. to 220 A.D.
A. 5 cl.
Prereq.: 265 or permission of instructor.
The political, economic, and cultural life of ancient China from the Shang dynasty to the end of the Han dynasty. Chang.

698 U G 5
Traditional China, 220 A.D. to 1800 A.D.
W. 5 cl.
Prereq.: 265 or permission of instructor.
The political, economic, and cultural life of Medieval China from the Age of Disunity to 1800 A.D. Chang.

697 U G 5
Modern China, 1800 to 1949
Sp. 5 cl.
Prereq.: 265 or permission of instructor.
History of modern China with emphasis on cultural contact between China and the West. Chang.

712 U G 3
Studies in the Age of Louis XIV
Sp.
Prereq.: 632 or equiv.
Open only to grad. students and by permission to seniors majoring in Hist.
Lectures, reading, and discussion of selected topics. Rule.

715* U G 3
The Second Commonwealth
A. 3 cl.
The restoration of Jewish statehood following the first Babylonian Exile and the history of Palestinian Jewry and of the Jewish Diaspora down to the 3rd century A.D. Chazan.

716* U G 3
The Jewish Community
Under Medieval Christianity
Sp. 3 cl.
The legal, social, economic, and cultural position of the Jews in the late Roman Empire and in Western Europe from the 4th century A.D. to 1500. Chazan.

717* U G 3
Jewry and Judaism in the Orbit of Islam
A. 3 cl.
History of the Jews in the Near East and North Africa from the Arab conquests to about 1500. Ankori.

718* U G 3
Jews in the Western World in Modern Times
A. 3 cl.
Changing patterns of Jewish life since the Jews' struggle for Emancipation; migration movements and the shift of Jewish centers in Europe and the New World. Ankori.

719* U G 3
The Jewish Settlement in Palestine From the Ottoman Conquest to Modern Times
A. 3 cl.
The flourishing Palestinian Jewish Center in the 16th century; Jewish immigration to Palestine; rise of modern Zionism; the British Mandate, and the State of Israel. Ankori.
720† UG 3
History of Ancient Israel
W., 3 cr.
The rise of the Jewish nation and religion in the Ancient Near East; settlement in Canaan; the Israelite and Judean monarchies until their conquest by Assyria and Babylonia. Ankor.

721† UG 3
The World of the Talmud
A., 3 cr.
The development of Jewish law and institutions in Palestine and Babylonia after the destruction of the Second Commonwealth; Rabbinic Judaism and diasporic Jewish self-government.

722 UG 3
Jews in the Mediterranean World
A., 3 cr.
East Mediterranean Jewry under the Byzantine Empire, its successor states, and under the Ottoman Turks; the Jews in Italy; rise and fall of Spanish Jewry. Ankor.

723 UG 3
Jews in Eastern Europe
A., 3 cr.
East European Jewish communities: their origin and function within medieval Polish society; self-governing institutions of Polish and Lithuanian Jewry; the "Jewish Question" in Tsarist Russia. Chazan.

724 UG 3
Messianic and Sectarian Movements in Jewry
Sp., 3 cr.
The history, doctrines, and polemics of the secessionist groups in medieval Jewry from the 7th to the 18th centuries. Ankor.

725 UG 3
Jews in America
W., 3 cr.
The rise and development of the American Jewish community, from colonial times to the present. Chazan.

730† (789) UG 3
Studies in European History, 1815 to 1814
W.
Open only to grad. students and by permission to seniors majoring in Hist. Political and social impact of Industrial Revolution; authoritarianism vs. liberalism; Church vs. State; nationalism; imperialism; emphasis on methods of historical research and documentary analysis. Dorpalen.

731 (790) UG 3
Studies in European History, 1914 to Present
A., Sp.
Open only to grad. students and by permission to seniors majoring in Hist. Political, social, and economic developments: World Wars I and II; Communism, Nazism; present-day Europe; emphasis on methods of historical research and documentary analysis. Dorpalen.

732 UG 3
Studies in German History
W.
Prereq.: 618 or equiv. Open only to grad. students and by permission to seniors majoring in Hist. Exploration of selected topics of 19th and 20th century German history; emphasis on methods of historical research and documentary analysis.

735 UG 5
The Habsburg Empire, 1740-1918
Sp., 5 cr.
A century and a half of Habsburg history with emphasis on Austria's responses to Enlightenment ideas, the French Revolution, social change, industrialization, and emerging nationalisms. Rogel.

736 UG 5
The Balkans from the Ottoman Conquest to World War I
W., 5 cr.
A historical survey of the Balkan peoples: political, social, economic, and cultural development; emphasis on the emergence and expression of Balkan nationalisms. Rogel.

737 UG 5
East Central Europe Since 1919
Su, Sp., 5 cr.
A survey of East Central Europe from the end of World War I to the present. Rogel.

738 UG 3
Studies in British History
A.
Prereq.: 632 and 633. Open only to grad. students and by permission to seniors majoring in Hist. Selected problems in British history since 1760: emphasis on different schools and interpretations, on methods of research, and on analysis of documents.

740† (771 A) UG 3
Studies in Russian History: Catherine the Great Through the Crimean War, 1762-1855
W.
Prereq.: 6 cr. hrs. of Russ. history or permission of instructor. An intensive study of problems in selected periods of Russian history. Curran and Morley.

741 (771 B) UG 3
Studies in Russian History: Alexander II through the Bolshevik Revolution, 1855-1917
Sp.
Prereq.: 5 cr. hrs. of Russ. history or permission of instructor. An intensive study of problems in selected periods of Russian history. Morley.

745 UG 5
History of European Warfare, 1688-1789
W., 5 cr.
The major aspects of European warfare in the late 17th and 18th centuries, with emphasis on the forces of England and France, between 1688 and 1715.
746 U G 5
History of European Warfare, 1790-1945
Sp. 5 cl.
European warfare from the French Revolutionary Wars to the surrender of Germany in 1945, with emphasis on the Napoleonic period and the Second World War.

768 U G 3
Studies in Military Thought and Strategy
W.
Prereq.: 668 or equiv.
Analysis and comparison of the most influential writers on the theory and practice of warfare including Machiavelli, Clausewitz, Mahan, Bloch, and Douhet. Millett.

770 U G 3
Studies in American Foreign Policy, 1775 to 1914
Sp.
Prereq.: 670.
Studies in the main problems of American foreign policy with primary emphasis on basic literatures and selected primary materials.

771 U G 3
Studies in American Foreign Policy, 1914 to Present
W.
Prereq.: 671.
Studies in the main problems of American foreign policy with primary emphasis on basic literatures and selected primary materials.

H783 (705) U 3-5
Honors Course
Prereq.: 4th yr, standing and 40 cr, hrs. in Hist. courses with a grade of A in at least half of the Hist. courses and an average of B in the remainder; permission of instructor under whose supervision the work is to be completed and the Honors Committee of the College. At least 2 qtrs. are required of candidates for the degree Bachelor of Arts with Distinction in Hist. Failure to receive a grade of B in this course is a disqualification for special honors. Repeatable to a maximum of 15 cr. hrs. Informal conferences to allow full scope to the initiative of the student; a special topic is assigned and results are tested by papers and special examinations.

800 (809) G 5
Seminar in European History
A.
Prereq. or concur.: 812.
Research topic to be announced. Grimm.

801 (810) G 5
Seminar in European History
Su, W.
Prereq. or concur.: 812.
Research topic to be announced later. Dorpalen and Pegues.

802 (811) G 5
Seminar in European History
Su, A, W.
Prereq. or concur.: 812.
Curran.

803 (815) G 5
Seminar in European History
Sp.
Prereq.: 812.
Poirier.

804 (816) G 5
Seminar in European History
A, Sp.
Prereq.: 812.
Research topic to be announced. Fisher and Rogel.

805 (817) G 5
Seminar in European History
W.
Prereq. or concur.: 812.
Rule.

806 G 3
Late Medieval Paleography and Diplomatics
Sp.
Prereq.: Permission of instructor.
Cursive hands in literature and diplomas, 1200-1500; the development of chanceries; notariats, secretariats, and the science of diplomatics; exercises with facsimiles, slides, and microfilm.

811 (812 A) G 3
Introduction to Historical Research in American History
A, W. 3 cl.
Prereq.: 1st qtr. Master's degree candidates in American History.
A practice course dealing with the problems involved in the preparation of the Master's thesis. Weisenburger.

812 (812 B) G 3
Introduction to Historical Research in European History
A. 3 cl.
Prereq.: 3rd qtr. Master's degree candidates in European History.
A practice course dealing with the problems involved in the preparation of the Master's thesis. Weisenburger.

813 G 5
Great European Historians
A.
A study of the leading historical writers and schools of Europe, with selected readings from representative writers. Roberts.

814 G 3
Great American Historians
A, Sp. 1 cl.
A study of the leading American writers and schools of history. Chapin.

840 G 5
Seminar in the History of the Physical Sciences
Sp.
Prereq.: Permission of instructor.
Research topic to be announced. Fullmer.
Seminar in East Asian History
W.
Prereq.: 646 and ability to use the Chinese language in research.
Techniques and tools of research in modern Chinese history; introductory reading in Chinese documents.
Li, Chang.

Seminar in History
Prereq.: Permission of graduate chairman and department chairman.
Research topic to be announced.

Charters of European Jewry: From Carolingian Times to the 18th Century
Sp. 1 cr.
Ankori.

The Jewish Community
Sp.
Studies in the institutional history of Jewry through the ages. Ankori.

Jewish Historiography
W.
Chazan.

Two Quarter Seminar in American History
W.
Prereq.: 811 and permission of instructor. 865 must be followed by 866.
Bremner.

Two Quarter Seminar in American History
Sp.
Prereq.: 811, 865, and permission of instructor. Bremner.

Seminar in American History
Sp.
Prereq. or concur.: 811.
Research topic to be announced. Dillon.

Seminar in American History
Su, Sp.
Prereq. or concur.: 811.
Research topic to be announced. Burnham and Kerr.

Seminar in American History
Su, A, W.
Prereq. or concur.: 811.
Research topic to be announced. Bowers, Chapin, and Young.

Seminar in American History
Su. A, W.
Prereq. or concur.: 811.
Research topic to be announced. Young and Zahniser.

Recent History of the United States, 1898-1928
W. 5 cr.

Recent History of the United States, Since 1928
W. 5 cr.
Continuation of 871, but may be taken separately. Prosperity and depression, the New Deal, the United States in international affairs, and the Second World War. Bremner and Burnham.

Seminar in United States Military History
Sp.
Prereq.: 668 or equiv.
Repeatable to a maximum of 15 cr. hrs. Millett.

History of Psychiatric Concepts
Sp. 1 cr.
Prereq.: Permission of instructor.
Psychiatric concepts and practices in their intellectual and social milieu from the Enlightenment to the 20th century. Burnham.

Interdepartmental Seminar
(See under Interdepartmental Seminars)

Research in History
Research for thesis or dissertation purposes only.

History of Art
Office: 240 Hopkins Fine Arts Center, 121 North Oval Drive

Professors Patton (Chairman) and Ludden; Associate Professors Cope, Malmkas, and Oda; Assistant Professors S. Herzog, Mealy, and Rubright; Instructors Crosby, C. Herzog, Jensen, Keyes, Kuhn, and Yuan.

Introduction to Art
Su, A, W, Sp. 3 cr.
Not open to juniors, seniors, or students with credit for Fine Arts 110, 111, or 494.
A study of meaning of visual form and imagery in architecture, sculpture, and painting. Fee.
210 Western Art I
A, W, Sp. 3 cl.
Prereq.: 2nd yr. standing or 111 or Fine Arts 110 or 111.
Not open to students with credit for Fine Arts 210 or (501).
A survey of Ancient and Early Medieval Art. Fee.

211 Western Art II
Su, A, W, Sp. 3 cl.
Prereq.: 3rd yr. standing or 111 or Fine Arts 110 or 111.
Not open to students with credit for Fine Arts 211 or (502).
A survey of Romanesque, Gothic, Renaissance, and Mannerist Art. Fee.

212 Western Art III
Su, A, W, Sp. 3 cl.
Prereq.: 3rd yr. standing or 111 or Fine Arts 110 or 111.
Not open to students with credit for Fine Arts 212 or (503).
A survey from Baroque through Contemporary Art. Fee.

213 Oriental Art
A, Sp. 3 cl.
Prereq.: Junior standing or 111 or Fine Arts 110 or 111.
Not open to students with credit for Fine Arts 213 or (509).
A survey of Far Eastern Art: India, China, and Japan. Fee.

216 Introduction to African Art
A. 5 cl.
Prereq.: Permission of instructor.
A survey of the major area of Africa: Western Sudan, Guinea Coast, Equatorial Forest region, and Southern Savannah region.

515 Renaissance Art in Italy
A. 5 cl.
Prereq.: 211 or Fine Arts 211 or permission of instructor.
Not open to students with credit for Fine Arts 515 or (654).
A study of architecture, sculpture, and painting in Italy during the 14th, 15th, and 16th centuries. Fee.

520 Modern European Art
W. 5 cl.
Prereq.: 212 or Fine Arts 212 or permission of instructor.
Not open to students with credit for Fine Arts 520.
European Art from about 1850 to the present, with emphasis on the outstanding masters of painting and sculpture. Fee.

530 American Art
Sp. 3 cl.
Prereq.: 212 or Fine Arts 212 or permission of instructor.
Not open to students with credit for Fine Arts 430 or (585).
A study of architecture, painting, and sculpture in America. Fee.

610 African Art I
W. 5 cl.
Prereq.: 216 or permission of instructor.
A study of the art and culture of the Western Sudan and Guinea Coast regions.

611 African Art II
Sp. 5 cl.
Prereq.: 216 or permission of instructor.
A study of the art and culture of the Equatorial Forest and Southern Savannah regions.

615 Latin American Art
W. 3 cl.
Prereq.: 9 cr. hrs. in Hist. of Art or permission of instructor.
Not open to students with credit for Fine Arts 615 or (675).
A survey of the Pre-Columbian, Colonial, and Modern periods in Hispanic America and Brazil. Fee.

616 The Art of India I
A. 3 cl.
Prereq.: 213 or Fine Arts 213 or 9 cr. hrs. in Hist. of Art.
Not open to students with credit for Fine Arts 616 or (655).
A cultural art history of India through classical times, Ca. 650 A.D., in terms of monuments, people, and religious philosophies.

617 The Art of India II
W. 3 cl.
Prereq.: 615 or Fine Arts 616.
Not open to students with credit for Fine Arts 617.
A study of the art history of post-classical India, Ceylon, Central Asia, Indonesia, and Indo-China. Fee.

618 The Art of China
W. 5 cl.
Prereq.: 213 or Fine Arts 213 or 9 cr. hrs. in Hist. of Art.
Not open to students with credit for Fine Arts 618 or (527).
A cultural art history of China in terms of monuments, people, and ideas. Fee.
619

U G 3

The Art of Japan
Sp. 3 cr.
Prereq.: 213 or Fine Arts 213 or 9 cr. hrs. in Hist. of Art.
Not open to students with credit for Fine Arts 619 or (628).
A cultural art history of Japan in terms of monuments, people, and beliefs. Fee.

620

U G 5

Greek Archaeology
A. 5 cr.
Prereq.: 210 or Fine Arts 210 or 10 cr. hrs. in Classics or permission of instructor.
Not open to students with credit for Fine Arts 620 or (669).
Minoan-Mycenaean civilization as revealed by archaeology; Classical Greek sites with emphasis on the arts and social, economic, and religious data provided by the archaeological material. Rubright. Fee.

621

U G 5

The Art of Ancient Egypt and the Near East
W. 5 cr.
Prereq.: 210 or Fine Arts 210 or permission of instructor.
Not open to students with credit for Fine Arts 621 or (670).
The specialized study of the art and archaeology of the valleys of the Nile and Tigris Euphrates in ancient times. Rubright. Fee.

622

U G 5

Ancient Greek and Roman Art
Sp. 5 cr.
Prereq.: 210 or Fine Arts 210 or permission of instructor.
Not open to students with credit for Fine Arts 622 or (671).
The development of Greek and Roman art from 1000 B.C. to late Roman times. Rubright. Fee.

624

U G 5

Early Christian and Byzantine Art
A. 5 cr.
Prereq.: 210 or Fine Arts 210 or permission of instructor.
Not open to students with credit for Fine Arts 624 or (632).
The Christian art of the Mediterranean region to the 8th century and the art of the Byzantine Empire to the 15th century. Ludden. Fee.

625

U G 5

Romanesque and Gothic Art
W. 5 cr.
Prereq.: 210 and 211 or Fine Arts 210 and 211, or permission of instructor.
Not open to students with credit for Fine Arts 625 or (633).
The art of Western Europe from the Carolingian period to the 14th century. Ludden. Fee.

627

U G 5

Northern Renaissance Art
Su. 5 cr.
Prereq.: 210 or Fine Arts 210 or permission of instructor.
Not open to students with credit for Fine Arts 627 or (684).
The art of the Netherlands, France, Germany, and England from 1400 to 1650—with emphasis on Jan van Eyck, Rogier van der Weyden, Fouquet, Durer, Holbein, Bosch, and Breughel. Mealy. Fee.

628

U G 3

Precursors to the Renaissance Art of Italy
A. 3 cr.
Prereq.: 211 or 515, or Fine Arts 211 or 515, or permission of instructor.
Not open to students with credit for Fine Arts 628.
The establishment of Florentine and Sieneese schools of painting during the 13th and 14th centuries as reflected in the works of Giotto and Simone Martini. Melnikas. Fee.

629

U G 5

Fifteenth Century Italian Art
Su. W. 5 cr.
Prereq.: 515 or Fine Arts 515, or permission of instructor.
Not open to students with credit for Fine Arts 629.
A selective study of painting and sculpture of the Quattrocento. Cope and Melnikas. Fee.

630

U G 5

Sixteenth Century Italian Art
Sp. 5 cr.
Prereq.: 515 or Fine Arts 515, or permission of instructor.
Not open to students with credit for Fine Arts 630.
A study of the major artists of the High Renaissance and Mannerist periods in Italy. Cope and Melnikas. Fee.

631

U G 5

Art of the 17th Century in Europe
A. 5 cr.
Prereq.: 9 cr. hrs. in Hist. of Art or permission of instructor.
Not open to students with credit for Fine Arts 631 or (696).
Baroque Art in Italy, France, Spain, and the Lowlands—with emphasis on the major artists. Cope. Fee.

633

The Art of Russia
A. 3 cr.
Prereq.: 9 cr. hrs. in Hist. of Art.
Not open to students with credit for Fine Arts 633.
A study of the history of art in Russia from the Pre-historic and Byzantine sources to the present. Fee.
634 U G 5
The Art of the 18th Century in Europe
W, 5 cl.
Prereq.: 212 or Fine Arts 212.
Not open to students with credit for Fine Arts 634.
The development of architecture, painting, and sculpture from the late Baroque and Rococo to Historicism. Fee.

635 U G 5
Nineteenth Century European Art
W, 5 cl.
Prereq.: 212 or 520, or Fine Arts 212 or 520, or permission of instructor.
Not open to students with credit for Fine Arts 635 or (678).
A study of European art from NeoClassicism through Post Impressionism, emphasizing the study of the works of the major painters. Fee.

636 U G 5
Twentieth Century European Art
Su, A, Sp, 3 cl.
Prereq.: 212 or Fine Arts 212 or permission of instructor.
Not open to students with credit for Fine Arts 636 or (629).
A study of the major achievements in painting, sculpture, and architecture since 1900. Fee.

637 U G 5
American Art to 1900
Sp, 5 cl.
Prereq.: 530 or Fine Arts 530.
Not open to students with credit for Fine Arts 637.
A study of the history of art in America from Colonial times to the end of the 19th century. Fee.

638 U G 3
Twentieth Century American Art
W, 3 cl.
Prereq.: 212 or 530, or Fine Arts 212 or 530, or permission of instructor.
Not open to students with credit for Fine Arts 638 or (669).
A study of significant developments in 20th century American architecture, painting, and sculpture. Fee.

693 U G 2-5
Individual Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Advanced study for students in specialized programs.

694 U G 2-5
Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Group studies for students in specialized programs.

715 U G 3
Research Methods in Art History
A.
Prereq.: 20 cr. hrs. in the Hist. of Art.
Not open to students with credit for Fine Arts 715 or (720).
Investigations of source materials, bibliography, concepts, and techniques of research. Cope.

718 U G 3
Studies in Italian Renaissance Art
A, W, 5 cl.
Prereq.: 515 or 629 or 630, or Fine Arts 515, 629, or 630, or permission of instructor.
Not open to students with credit for Fine Arts 718 or (730).
Repeatable to a maximum of 15 cr. hrs.
Selected problems in painting, sculpture, and architecture of Italy in the 14th, 15th, and 16th centuries. Cope and Melnikas. Fee.

724 U G 3
Studies in Northern Baroque Art
Su, Sp, 3 cl.
Prereq.: 631 or Fine Arts 631.
Not open to students with credit for Fine Arts 724.
Repeatable to a maximum of 9 cr. hrs.
Selected problems in the painting, sculpture, and architecture of Belgium, Holland, Germany, and France in the 17th and 18th centuries. Fee.

725 U G 3
Studies in Italian Baroque Art
Su, Sp, 3 cl.
Not open to students with credit for Fine Arts 725 or (768).
Selected problems in the painting, sculpture, and architecture of the 17th century. Cope. Fee.

726 U G 3
Studies in Spanish Art
W, 3 cl.
Prereq.: Permission of instructor.
Not open to students with credit for Fine Arts 726 or (704).
A selective study of the architecture, sculpture, painting, and minor arts of Spain. Cope. Fee.

737 U G 3
Studies in American Art
A, 3 cl.
Prereq.: 530 or Fine Arts 530 or permission of instructor.
Not open to students with a maximum of 9 cr. hrs. for Fine Arts 737.
Repeatable to a maximum of 9 cr. hrs.
Selected problems in the painting, sculpture, and architecture of the United States. Patton. Fee.
H 783 U 3-5
Honors Course
Prereq.: 4th yr. standing with a grade of A in at least half of the Hist. of Art courses taken with an average of B in the remainder; permission of instructor under whose supervision the work is to be completed and the Honors Committee of the College. At least 2 qtrs. are required of candidates for the degree B.A. or B.F.A. with distinction in Hist. of Art. Failure to receive a grade of at least B in this course is a disqualification for special honors.
Repeatable to a maximum of 15 cr. hrs.
A program of study arranged for each student, with individual conferences, reports, and honors thesis.

816† G 3-5
Museum Problems
W.
Not open to students with credit for Fine Arts 816 or (685).
An introduction to professional work in museums.

839 G 3
Studies in Art Theory and Criticism
W.
Not open to students with credit for Fine Arts 839 or (721).
Investigations of theories of art and their applications.
Ludden.

917 G 2-5
Seminar in Medieval Art
Sp.
Prereq.: Permission of instructor.
Not open to students with credit for Fine Arts 917 or (804C).
Repeatable to a maximum of 15 cr. hrs.
Ludden.

920 G 2-5
Seminar in Italian Renaissance Art
W, Sp.
Prereq.: Permission of instructor.
Not open to students with credit for Fine Arts 920 or (804F).
Repeatable to a maximum of 15 cr. hrs.
Cope and Meilnikas.

930 G 2-5
Seminar in Modern Art
A.
Prereq.: Permission of instructor.
Not open to students with credit for Fine Arts 930 or (804D).
Repeatable to a maximum of 15 cr. hrs.

932 G 2-5
Seminar in American Art
A, W.
Prereq.: Permission of instructor.
Not open to students with credit for Fine Arts 932 or (804E).
Repeatable to a maximum of 15 cr. hrs.
Patton.

939 G 2-5
Seminar in Art Theory and Criticism
Sp.
Prereq.: Permission of instructor.
Not open to students with credit for Fine Arts 939 or (804B).
Repeatable to a maximum of 15 cr. hrs.
Ludden.

993 G 1-5
Individual Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.

994 G 1-5
Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Group studies for students in specialized programs.

999 G Arr.
Research in History of Art
Research for thesis and dissertation purposes only.

Home Economics
Office: 229 Campbell Hall, 1787 Neil Avenue
Professors Lund (Director), Cleveland, Dalrymple, Deacon, Dirks, Gilmore (Associated Director), Gorman, Green, Haynes, Heye, Higgins, Lapitsky, Maloch, Spray, Vivian, and Wilson; Associate Professors Alexander (Assistant Director), Beard, Bolieratz, Derke, Hall, Harnance, Hubbard, Hunt, Johnston, Lloyd, McCormick, Meachem, Millican, Sarbaugh, Tappcott, Taylor, and Warfield; Assistant Professors Andrian, Bailey, Beckwith, Bloom, Bowers, Butler, Cremer, Dickerscheid,Everhart, Fulton, Herr, Lehr, Rouch, and Williams; Instructors Baker, Blauwe, Delichert, Evans, Greisemer, Klimatic, Marshall, Mitchell, Mortularity, Olson, Reed, and Ridder.

The courses in Home Economics may be grouped as follows:
Family and Child Development—460, 362, 363, 462, 467, 589, 10, 593, 10, 594, 10, 598, 662, 663, 667, 690, 10, 794, 10, 860, 861, 862, 993, 10, 999
Food and Nutrition—110, 310, 311, 314, 413, 589, 01, 589, 02, 593, 01, 593, 02, 594, 01, 594, 02, 596, 610, 612, 615, 616, 690, 01, 690, 02, 711, 794, 01, 794, 02, 802, 810, 813, 816, 993, 01, 993, 02, 995.
Home Economics Education—441, 442, 443, 589, 09, 589, 11, 593, 09, 593, 11, 594, 09, 594, 11, 690, 09, 690, 11, 794, 09, 840, 841, 842, 844, 844, 845, 993, 09, 999.
Management, Housing and Equipment—228, 320, 321, 325, 326, 327, 328, 423, 424, 427, 589, 05, 589, 06, 589, 07, 593, 05, 593, 06, 593, 07, 594, 05, 594, 07, 622, 623, 624, 628, 690, 05, 690, 06, 690, 07, 794, 05, 794, 06, 794, 07, 822, 825, 826, 827, 993, 05, 993, 06, 993, 07, 999
110 (440) U 5
Elements of Nutrition
W, Sp. 5 cl.
Not open to students majoring in Home Ec. nor students with more than 10 cr. hrs. of chem.
Nutritional needs throughout the life cycle. Herr.

GENERAL PREREQUISITES FOR COURSES
NUMBERED 200
Unless otherwise indicated, the prerequisites for 200-level courses are 45 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-199.

228 (513) U 3
Home Furnishings: Furniture
A. 2-2 hr. cl., 1-2 hr. lab.
Economic factors and trends in materials, construction and finishes; some experience in reconditioning and other techniques. Everhart.

230 (570) U 2
Introduction to Institution Management
W. 1-2 hr. cl.
Orientation to the fields of food service management and executive housekeeping. Cremer.

270 (530) U 3
Costume Design
A, W, Sp. 2 cl., 1-2 hr. lab.
Prereq.: Art 290 or equiv.

274 (507) (514) U 5
Clothing: Construction Techniques and Needlecrafts
W. 2 cl., 2-3 hr. labs, 2-3 hr. arr.
Prereq.: Major standing in Oc. Ther.
Not open to majors in Home Ec.
Experience in activities of needlecraft and clothing construction which may have therapeutic value. Marshall.

280 (599) U 2
Home Economics as a Profession
A, W. 2 1/2 hr. cl.
The nature and status of home economics as a field of study and as a profession. Alexander.

GENERAL PREREQUISITES FOR COURSES
NUMBERED 300 AND 400
Unless otherwise indicated, the prerequisites for 300 and 400-level courses are 50 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-399.

310 (548) U 5
Fundamentals of Nutrition
A, W, Sp. 5 cl.
Prereq.: Chem. 101 and 102 or equiv.
Not open to students with credit for 310.
Basic information in the science of nutrition as applied to man. Mitchell.

313 (555) U 3
Food in Different Cultures
A. 3 cl.
Prereq.: 310 or equiv. recommended; 10 cr. hrs. of social science.
Food practices of selected peoples of the world with consideration of the existing social, cultural, and economic conditions. Roush.

314 (549) U 5
Food
A, W, Sp. 2 cl., 3 2-hr. lab.
Prereq.: 10 cr. hrs. Chem.
Application of chemical and physical principles to food preparation and use. Green. Fee.

320 (510) U 3
Housing
A, W, Sp. 3 cl.
Prereq.: 360 or 10 cr. hrs. social science.
Housing as it affects family living and is in turn affected by family needs, social and economic trends and the physical environment. Everhart.

322 (506) U 5
Household Equipment: Introduction
Su, A, W, Sp. 4 cl., 1 2-hr. lab.
Prereq.: 15 cr. hrs. of natural science.
Principles involved in the selection, construction, operation, and care of household equipment and their relation to the well-being of the family. Beard and Bloom.

325? (518) U 3
Elements of Homemaking
A. 3 cl.
Prereq.: 3rd yr. standing.
Not open to majors in Home Ec.
Principles of home management and use of family resources in relation to family well-being.

326 (559) U 3
Home Management: The Family and the Market
Su, A. 3 cl.
Prereq.: Econ. 201, and 10 cr. hrs. of social science.
The market from the family point of view and its relation to home management practices. Bowers.

327 (560) U 5
Home Management
Su, A, W, Sp. 5 cl.
Prereq.: 3rd yr. standing and Econ. 201 or equiv.
Management process of utilizing specific resources for family's well-being. Lloyd and Maloch.
328  (512)  U 5  
Home Furnishings: Principles  
Su, A, W, Sp.  3 cl., 2 2-hr. lab.  
Prereq.: Art 200 or Design 250.  
Application of art principles to furnishing a home with consideration of aesthetic, economic, and social factors affecting choice. Everhart.

360  (562)  U 5  
Family Development  
A, W, Sp.  5 cl.  
Prereq.: 10 cr. hrs. of social science.  
The dynamics of family interaction at each stage of the life cycle; emphasis on developmental tasks, socioeconomic and cultural influences and other family differences. Lehr and Taylor.

362  (561)  U 4  
Introduction to Child Development  
Su, A, W, Sp.  3 cl., 2 morning hrs. arr. for nursery school observation.  
Prereq.: Psychol. 100 or equiv. recommended.  
Study of the nature, nurture, and development of children with emphasis on the preschool years. Griffing.

363  (563)  U 5  
Child Development  
Su, A, W, Sp.  5 cl.  
Not open to students with credit for 362.  
Developmental patterns of children with emphasis on physical, social, and emotional maturation, especially during the formative years; environmental influences and appropriate guidance. Heye and Lehr.

371  (505)  U 5  
Textiles  
A, W, Sp.  4 cl., 1 2-hr. lab.  
Prereq.: 10 cr. hrs. Chem.  
Study of the physical and chemical properties of textiles and their components as they relate to care, performance and consumer satisfaction. Butler and Tapscoot.

374  (531)  U 5  
Clothing: Design Analysis  
A, W, Sp.  2 cl., 3 2-hr. lab.  
Prereq.: 270, 371, and skill in the basic construction processes.  
Adoption of standard patterns to individual proportions, flat pattern designing, and application of principles of design and construction in making garments. Marshall.

413  (550)  U 4  
Foods: Meal Management  
A, W, Sp.  2 cl., 2 3-hr. lab.  
Prereq.: 310 and 314.  
Nutritional, aesthetic, and social aspects of planning, purchasing, preparing, and serving food to family groups at different income levels. Rosh. Fee.

423†  (619)  U 3  
Household Equipment  
W.  2 cl., 1 2-hr. lab.  
Prereq.: 322; prereq. or concur. 328.  
Application of the recent developments in lighting to home situations with emphasis on selection, care, and use of home lighting equipment. Everhart.

427  (627)  U 4  
Home Management  
Su, A, W, Sp.  5 cl., lab. hrs. arr.  
Prereq.: 327 and senior standing in Home Ec.  
Report to Room 166 E, Campbell Hall, to make application and to check for eligibility at least two qtrs. in advance.  
Application and integration of management principles to operation of a household. Bowers and Lloyd.

430†  (571)  U 3  
Menu Planning for Food Service Establishments  
W.  3 cl.  
Prereq.: 230 and 413.  
Principles and practices of menu planning for school, industrial, and commercial food units; menus planned for each type of institution.

431  (631)  U 5  
Quantity Food Production and Service  
A, Sp.  1 2-hr. cl., 8 hrs. lab.  
Prereq.: 230, 310, and 314.  
Individual experience in application of food preparation principles to quantify production; use and care of large equipment; standardized formulae and costs; service to the public. Cremer.

435  (545)  U 4  
Principles of Teaching Applied to Institution Management  
W.  1 1-hr. cl., 1 2-hr. cl., field experience.  
Prereq.: 431, Psychol. 100, and permission of instructor.  
Principles of education for students whose professional work will require knowledge of techniques for teaching others in non-school situations.

441  (541)  U 5  
Principles and Methods of Teaching Applied to Home Economics  
A, W, Sp.  3 cl., ½ day arr.  
Prereq.: 40 cr. hrs. in Home Ec.  
Consideration of curriculum, methods of teaching, management, and other problems of the home economics teacher.

442  (542)  U 15  
Supervised Home Economics Teaching  
A, W.  Full time for 1 qtr. for 15 cr. hrs.  
Prereq.: 441, and 55 cr. hrs. in Home Ec, and 2.25 cumulative point-hour ratio 2 qtrs. immediately preceding.  
For vocational certification, students must do their teaching in a vocational center.  
Registration with the Teacher Placement Service of the College of Education.  
Not open to students with credit for 443.  
Guided participation in the responsibilities and activities of the Home Economics teachers in the regular day school and extended school program.
443† (543) U 3
School-Community Problems of the Home Economics Teachers
Su. 3 cl., arr. hrs. for observation and participation. Prereq.: 441, 442, and permission of instructor. For vocational certification only. Not open to students with credit for 442. Responsibilities and activities of the home economics teacher in the extended school program with emphasis on adult education, home experience, related home economics teacher activities. Dirks.

462 (664) U 3
Nursery School Activities
Su, A, W, Sp. 3 cl. Prereq.: 362 or 363; prereq. or concur. 463. Application of principles of development to program planning; modification of activities for age level, ability, experience, group and individual needs. Deichert and Dickerscheid.

463 (665) U 2
Nursery School Practicum

470 (508) U 3
Clothing: Fashion and the Ready-to-Wear Market
Sp. 5 cl. Prereq.: 3rd yr. standing. Fashion, the ready-to-wear market and current developments in the field of textiles and clothing and their relation to satisfying consumer needs. Millican.

471 (673) U 5
Advanced Textiles
W, Sp. 4 cl., 1 3-hr. lab. Prereq.: 371. Not open to students with credit for 517. Advanced study of chemical and physical textile properties; new developments; standards and testing procedures used in evaluation of textiles. Butler and Lapitsky.

GENERAL PREREQUISITES FOR COURSES NUMBERED 500
Unless otherwise indicated, the prerequisites for 500-level courses are 15 cr. hrs. in courses in the same discipline numbered 200 or higher, or 10 cr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 200 or higher in specified allied disciplines; or baccalaureate degree.

538† U 5
Executive Housekeeping: Furnishings, Equipment, and Maintenance
W. 5 cl. Prereq.: 230, 322, 328, and History of Art 111. Principles and standards for planning house departments; selection and arrangement of furnishings and equipment; maintenance and service for various types of institutions.

574 (601) U 5
Clothing
Su, W. 2 cl., 2 3-hr. lab. Prereq.: 374. Evaluation and application of design and fashion principles in relation to tailored garments; quality-price relationship; optimum utilization of materials and resources. Millican.

589 (585) U 3, 5 or 15
Field Work in Home Economics
Su, A, W, Sp. Prereq.: Senior standing in Home Ec., 2.25 cumulative point-hour ratio, and permission of instructor. Registration 2 qtrs. before scheduling. Limited to 5 cr. hrs., except in qtrs. and areas indicated below.

589.01 Foods 3 or 5
589.02 Nutrition 3 or 5
589.03 Textiles 5
589.04 Clothing 15
A. 589.05 Home Furnishings and Housing 3 or 5
589.06 Household Equipment 5
589.07 Home Management 3 or 5
589.08 Institution Management 3 or 5
589.09 Home Economics Education 3 or 5
589.10 Family and Child Development 3 or 5
589.11 Home Economics Extension 3, 5, or 15

H390 U 3
Home Economics Colloquia
W. 3 cl. Prereq.: Eligibility for Honors Program in Home Ec. Repeatable to a maximum of 9 cr. hrs. Subjects will be oriented in different quarters to natural science, social science, and general home economics topics.

593 U 2, 3 or 5
Individual Studies
Su, A, W, Sp. 1 or more cont. H593 (honors) may be available to students enrolled in a college honors program or eligible for enrollment. Prereq.: Minimum of 6 cr. hrs. in subject matter of problem with cumulative point-hour ratio of 2.7 in Home Ec. subjects and permission of instructor. Repeatable to a maximum of 10 cr. hrs.

593.01 Food
593.02 Nutrition
593.03 Textiles
593.04 Clothing
593.05 Home Furnishings and Housing
593.06 Household Equipment
593.07 Home Management and Family Economics
593.08 Institution Management
593.09 Home Economics Education
593.10 Family and Child Development
593.11 Home Economics Extension
594  U 3 or 5
Group Studies
Su, A, W, Sp.  3 cl.
Repeatable to a maximum of 10 cr. hrs.
294.01 POED
594.02 Nutrition
594.03 Textiles
594.04 Clothing
594.05 Home Furnishings and Housing
594.06 Household Equipment
594.07 Home Management and Family Economics
594.08 Institution Management
594.09 Home Economics Education
594.10 Family and Child Development
594.11 Home Economics Extension

595†  (660)  U 2
Textiles and Clothing Seminar
W, Sp.  2 cl.
Prereq.: 4th yr. standing, and major in textiles and clothing.
Special reports and readings in textiles and clothing which contribute to professional effectiveness and promote integration of information in the two fields.

596  (660)  U 2
Food and Nutrition Seminar
Sp.  2 cl.
Prereq.: 4th yr. standing, and major in food and nutrition.
Reports based on current research, recent summaries and articles which give perspective in food and nutrition.

598  (665)  U 2
Seminar in Child Development
W.  1 cl.
Prereq.: 360 and 362.
Review, interpretation, and evaluation of current literature and research in defined areas, with emphasis on recommended professional standards in group care of children. Gridding.

GENERAL PREREQUISITES FOR COURSES NUMBERED 600
Unless otherwise indicated, the prerequisites for 600-level courses are 15 cr. hrs. in courses in the same discipline numbered 300 or higher, or 10 cr. hrs. in courses numbered 300 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 300 or higher in specified allied disciplines.

610  UG 5
Nutrition
W.  5 cl.
Prereq.: 310, Physiol. 311, and Biochem. 511.
Modern concepts of normal nutrition. Green.

612  UG 3
Nutrition: Diet Therapy
Sp.  3 cl., other hrs. arr.
Prereq.: 610 or equiv.
Modern concepts of clinical nutrition and abnormalities treated by modification of the diet.

615  UG 5
Experimental Work in Food Preparation
A, Sp.  3 cl., 2 3-hr. lab.
Prereq.: 314, and Chem. 231 or Biochem. 511.

616  UG 3
Nutrition of Infants and Children
Sp.  3 cl.
Prereq.: 610.
Needs of children for good nutrition from the embryonic stage through adolescence.

622  UG 5
Household Equipment: Performance Testing
A.  2 cl., 3 2-hr. lab.
Prereq.: 314, 322, and 5 cr. hrs. in Microbiol.
Experimental problems on the performance of the major types of household equipment used in the preparation of food. Hunt.

623  UG 5
Household Equipment: Performance Testing
Sp.  2 cl., 3 2-hr. lab.
Prereq.: 322, 371, or equiv., and 4th yr. standing in Home Ec.
Experience in the techniques and reporting of experimental investigations dealing with household equipment used in laundering and other cleaning processes. Bloom and Dickerscheid.

624  (580)  UG 5
Household Equipment:
The Home Economist in Business
W.  2 cl., 3 2-hr. lab.
Prereq.: 622, 5 cr. hrs. in Speech.
Not open to students with credit for 422.
Evaluation and development of the individual's qualifications to meet professional requirements of a home economist in businesses related to household equipment. Bloom.

628  UG 3
Selection of Furnishings for the Home
Su, Sp.  2 cl., 1 2-hr. lab. Field trips arr.
Prereq.: 327, 328, and 371.
Consumers' problems in the selection of home furnishings.

630  UG 5
Selection of Food and Equipment for Institutions
W.  5 cl.
Prereq.: 431 or equiv. and Econ. 201.
Principles and standards for selection of food, equipment, and furnishings in institution food service, arrangement and layout. Hubbard.

632  UG 5
Institution Organization and Management
Sp.  3 cl., 6 hrs. lab. arr.
Principles of business organization and management and principles of learning applied to the management of food service operations; supervised experience in meal management.
635† (731) U G 3
Food Cost Analysis for Institutions
A. 2-3 hr. cl.
Prereq.: 121 and Bus. Org. 400.
Factors and procedures involved in controlling food and house department costs; evaluation of data from records and reports.

662 U G 3
Child Development
W. 2 cl., 2 hrs. arr.
Prereq.: 363, Psychol. 550, and Soc. 434.
Growth and development of children from six through adolescence with emphasis on maturation patterns and individual differences. Lehr.

663 U G 3
Infant Guidance and Care
A. 2 cl., 1 2-hr. lab. arr.
Prereq.: 362, Psychol. 550, and Soc. 434.
Pattern of development during infancy and the second year of life, and responsibilities of adults for providing a home environment favoring optimum development.

667 (762) U G 3
Administration of Day Care Centers
Su, A. 3 cl.
Prereq.: 462 and 463 or equiv.
Program planning to meet developmental level and needs of young children; minimum and recommended standards. Meye.

671 U G 3
Textiles: Technology
Su. 1 cl., 2 2-hr. lab.
Prereq.: 471.
Experience in planning and conducting textile tests and in evaluating resulting data; development, present status, and importance of textile testing. Butler.

672 U G 5
History of Costume and Textiles
W, Sp. 5 cl.
Prereq.: 471.
A chronological study of costume and textiles from ancient civilization to modern times, with consideration of cultural forces that affected the development. Millican.

674 (604) U G 5
Clothing: Advanced Design Analysis
A, W, Sp. 2 cl., 3 2-hr. lab.
Prereq.: 374 or equiv.
Creative interpretation of dress design terminating in finished garments developed through the media of flat pattern and draping.

690 (799) U G 4
Home Economics Workshop
Su. Full time for 3 wks.
Prereq.: Permission of instructor.
Repeatable to a maximum of 12 cr. hrs.

Workshops in the following phases:
690.01 Foods
690.02 Nutrition
690.03 Textiles
690.04 Clothing
690.05 Home Furnishings and Housing
690.06 Household Equipment
690.07 Home Management and Family Economics
690.08 Institution Management
690.09 Home Economics Education
690.10 Family and Child Development
690.11 Home Economics Extension

GENERAL PREREQUISITES FOR COURSES NUMBERED 700
Unless otherwise indicated, the prerequisites for 700-level courses are 15 cr. hrs. in courses in the same discipline numbered 400 or higher, plus additional specified course(s) numbered 600 or higher.

711 U G 3
Nutrition: History
W. 3 cl.
Prereq.: 610 and permission of instructor.
Persons, discoveries, and methods in the evolution of nutrition as a science and a factor in the control of human welfare. Vivian.

794 U G 2, 3 or 5
Group Studies
Su, A, W, Sp. 3 cl.
Prereq.: Permission of instructor.
Repeatable to a maximum of 10 cr. hrs.

794.01 Food
794.02 Nutrition
794.03 Textiles
794.04 Clothing
794.05 Home Furnishings and Housing
794.06 Household Equipment
794.07 Home Management and Family Economics
794.08 Institution Management
794.09 Home Economics Education
794.10 Family and Child Development
794.11 Home Economics Extension

GENERAL PREREQUISITES FOR COURSES NUMBERED 800 AND 900
Unless otherwise indicated, the prerequisites for 800 and 900-level courses are 30 cr. hrs. in courses in the same discipline, or 20 cr. hrs. in the same discipline, plus 25 cr. hrs. in specified allied disciplines.

802 (810) G 3 or 5
Seminar in Foods and Nutrition
Prereq.: 610 or 615 and permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
  a. Research Methods in Food and Nutrition—Su.
  b. Energy Metabolism—Su.
  Hubbard and Vivian.

810 (705) G 3
Research Methods in Nutrition
A. 3 cl.
Prereq.: 610, Biochem. 511, and Physiol. 312 or equiv.
Organization, methods, analysis of data and reporting projects in nutrition research. Vivian.
813† (715) G 3
Introductory Food Research
Sp. 1 cl., 2 hr. lab.
Prereq.: 415 and Biochem. 511 or equiv.
Individual experiments in food preparation, processing in the home and food storage carried out in laboratory, analyzed and reported.

816 (735) G 3
Recent Developments in Food and Nutrition Research
Sp. 3 cl.
Prereq.: Biochem. 511 or equiv.
Brief survey of recent research.

822 (820) (821) G 3 or 5
Seminar in Management, Housing, and Equipment
W. 3 cl.
Prereq.: 30 cr. hrs. in Home Ec., including 622 or 623 or 825 or 826 depending on emphasis of topic, and permission of instructor.
Repeatability to a maximum of 15 cr. hrs.
- Home Furnishings and Housing—W.
- Home Management and Family Economics—W.
- Household Equipment—Sp.
Deacon.

825 (720) G 3
Home Management: Activity Analysis
Su. W. 2 cl.
Prereq.: 10 cr. hrs. in home management and household equipment or equiv.
Advanced study in application of work principles to design of appliances, work space areas, and methods of work in the home. Malach.

826 (721) G 3
Family Economic Resources and Functions
Sp. 3 cl.
Prereq.: 326 or equiv.
Principles, major problems, and trends in the economics of the family.

827 (719) G 3
Home Management: Development and Theory
A. 3 cl.
Prereq.: 327.
Historical development and present trends in home management with emphasis on theory and practices. Deacon.

830 G 3 or 5
Trends in Food Service Management
W. 3 cl.
Prereq.: 20 cr. hrs. in quantity food production, organization and management, experience in food service management or administrative dietetics, interpretation of principles and current research in relation to management of food service organizations at the policy-making level. Hubbard.

832 (831) G 3 or 5
Seminar in Institution Management
Su. 1-2 cl.
Prereq.: Graduate standing in Home Ec. and permission of instructor.
Repeatability to a maximum of 15 cr. hrs.
Topics to be announced. Hubbard.

840 (750) G 3
Research Methods in Home Economics
Su. A. 3 cl.
Prereq.: Master’s degree students in Home Ec.
Nature of research in various areas of the field; criteria for setting up a research problem; techniques for collecting and analyzing data. Dalrymple.

841 (740) G 3
Home Economics in American Education
A. 3 cl.
Prereq.: 441 or equiv. and permission of instructor.
An overview of home economics at the elementary, secondary, higher education and adult levels; general trends in enrollment, curriculum and guidance, supervision, administration and research.

842 (840) G 3
Home Economics in Higher Education
W. 3 cl.
Prereq.: 841 or equiv.
Present status and function of home economics at the college level; problems in curriculum development; criteria for effective teaching, guidance, and testing procedures.

843 (841) G 3 or 5
Seminar in Home Economics Education
W. 1-2 cl.
Prereq.: Grad. standing in Home Ec. and permission of instructor.
Repeatability to a maximum of 15 cr. hrs.
- Research in Home Economics—Su.
- Administration in Home Economics—Sp.

844 (742) G 5
Evaluation in Home Economics
Sp. 3 cl.
Prereq.: 841.
Procedure for appraising student progress in the attainment of objectives; construction of evaluation instruments, analysis, and interpretation of data from evaluation programs.

845 (702) G 3
Supervision of Home Economics Teaching
A. 3 cl.
Prereq.: 846.
For experienced teachers of home economics who are interested in supervising student teachers or in working with home economics teachers in service.

846 (741) G 3
The Teaching of Home Economics
Su, Sp. 3 cl.
Prereq.: 841 or equiv. and permission of instructor.
Home economics in integrated, core, experimental, and other special types of programs.
The Family: The Early Years
Su, W. 2 1/2-hr. cl.
Prereq.: 25 cr. hrs. in social, and psychol., or equiv.
Relationships and adjustments in family living with emphasis on the early and expanding stages of the family life cycle. Taylor.

The Family: Middle and Later Years
A. 3 cl.
Prereq.: 860.
The interrelationship and adjustment of families with emphasis on the middle and later years of the life cycle. Taylor.

Seminar in Family and Child Development
A, Sp. 1-3 cl.
Prereq.: Grad. standing in Home Ec, and permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
  a. Parent-Child Relationships. W.*
  b. Learning, Theory and Its Relationship to Nursery Education. W.*

Clothing: Fashion
W, Sp. 3 cl. plus independent study.
Prereq.: 672 and 25 cr. hrs. in courses in Social., Psychol., Econ., or Bus. Admin.
Fashion as a social and economic force—its influence on production, distribution, and consumption of textiles and clothing. Gilmore.

Textiles: Chemical Analysis
W. 1 cl., 2 4-hr. lab.
Prereq.: 472, Chem. 242, and 243.
Application of chemical techniques to the quantitative and qualitative analysis of textile materials, including analysis of fiber content, and non-fibrous materials. Lapitsky.

Seminar in Textiles and Clothing
Prereq.: 672 and 870 or 671, or 842 and Ed. 845, depending on emphasis of topic and permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
  a. Economics of Textiles A
  b. Social-Psychological Aspect of Clothing. W.
Gilmore, Lapitsky, and Meacham.

Interdepartmental Seminar in Nutrition and Food Technology
Sp.
(See under Interdepartmental Seminars.)

Interdepartmental Seminar
(See under Interdepartmental Seminars.)

Individual Studies
Su, A, W, Sp. 1 cont. or more.
Prereq.: Permission of instructor.
Problems in various phases of home economics chosen for individual study.

Food
Nutrition and Dietetics
Textiles
Clothing
Home Furnishings and Housing
Household Equipment
Home Management and Family Economics
Institution Management, Equipment, and Food Buying
Home Economics Education
Family and Child Development

Research
Research for thesis or dissertation purposes only.

Horticulture
Office: 152 Horticulture, Forestry, and Food Technology Center, 2003 Fyffe Court


Introduction to Landscape Horticulture
A. 2 cl., 1-hr. lab.
Value of landscape horticulture to the individual and community including culture, identification, and use of plants in planting design and interior decoration. Kozel.

GENERAL PREREQUISITES FOR COURSES NUMBERED 200
Unless otherwise indicated, the prerequisites for 200-level courses are 45 cr. hrs. in college courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-199.

Plant Science in Agriculture
(See Agron. 200)
(Received in cooperation with the Depts. of Hort. and Forest, and Agron.)
Horticultural Morphology
A, Sp. 3 cr.
A study of horticultural plant materials emphasizing the interpretation of gross plant structures and their development in relation to cultural practices and the environment. Hartman.

Food Preservation
Sp. 3 cr.
Introduction to the food processing industry; principles involved in the modern methods of assembling, processing, and distribution of food. Gould.

Plants and Man
W. 4 cr., assigned reading 1 hr.
Prereq.: 5 cr. hrs. Biological Sciences and membership in a College Honors Program or eligibility for membership in a College Honors Program. Not open to students with credit for Agron. 200, (403), or Hort. (462).
The influence and interaction of limiting factors on plant growth with emphasis on principles utilized by man to increase productivity and value of plant products. Geissman and Herr.

GENERAL PREREQUISITES FOR COURSES NUMBERED 300 AND 400
Unless otherwise indicated, the prerequisites for 300 and 400-level courses are 90 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-299.

Landscape Horticulture I—Herbaceous Plants
Sp. 3 cr., 2 2-hr. lab.
Prereq.: 203 and Bot. 102.
The identification, culture and landscape use of bulbs, annuals, herbaceous perennials, and garden roses; identification of lawn grasses and turf management are also covered. Reisch.

Landscape Horticulture II—Woody Deciduous Plants
A. 3 cr., 2 2-hr. lab.
Prereq.: 203 and Bot. 102.
A detailed study of deciduous trees, shrubs and vines, their identification, growth habits, culture, adaptation to environmental conditions, uses, combinations, and management in landscape plantings. Reisch. Fee.

Landscape Horticulture III—Woody Evergreen Plants
W. 3 cr., 2 2-hr. labs.
Prereq.: 203 and Bot. 102.
Detailed study of narrow and broadleaf evergreens, their identification, growth habits, culture, uses, and management in landscape plantings; winter characteristics of deciduous plants reviewed. Reisch.

Landscape Horticulture IV—Woody Plants
Sp. 3 cr., 2 2-hr. labs.
Prereq.: 432 and 433.
Woody plants used for specific landscape function and unusual environment situations; aesthetic features of plants are studied in detail with emphasis on selected major genera. Kozel. Fee.

Processing of Fruit and Vegetable Products
W. 3 cr., 2 2-hr. labs.
Prereq.: Chem. 102 or 122.

Quality Attributes of Fruits, Vegetables, and Related Foods
Sp. 3 cr., 2 2-hr. labs.
Prereq.: Chem. 102 or 122.
Identifying, evaluating, and controlling quality attributes of fresh and processed fruits, vegetables, and related products as to consumer acceptance, nutrition, and use. Gould.

Principles of Vegetable Crop Production
W. 4 cr., 2-hr. lab.
Prereq.: 203.
The production and utilization of vegetable crops, including potatoes, with emphasis on environmental factors which influence growing and handling of these crops. Albam.

Principles of Tree Fruit Production
A. 4 cr., 2-hr. lab.
Prereq.: 203 or equiv.
A study of the fundamental principles of pome and stone fruit production with emphasis on recognition and solution of problems according to modern scientific concepts. Hartman. Fee.

Principles of Small Fruit Production
W. 4 cr., 2-hr. lab.
Prereq.: 203.
A study of small fruit production with emphasis on the recent biological advances from which this technology has evolved.

Horticultural Industries Experience
Prereq.: Major standing in Hort.
Repeatable to a maximum of 4 cr. hrs.
Required for two crs. for students majoring in Land Hort. under Agr. Ind. degree program.
Ten weeks of planned and supervised practical experience in an approved horticulturist enterprise, including completion of a special problem with a written report.
GENERAL PREREQUISITES FOR COURSES NUMBERED 500
Unless otherwise indicated, the prerequisites for 500-level courses are 15 cr. hrs. in courses in the same discipline numbered 200 or higher, or 10 cr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 200 or higher in specified allied disciplines, or baccalaureate degree.

515 (440) U 5
Plant Propagation
Sp. 4 cl., 1 2-hr. lab.
Prereq.: 203, 431, 432, and Bot. 102.
Not open to students with credit for 415.
Study of the principles and commercial practices involved in the sexual and asexual propagation of horticultural plants; facilities, equipment, and pathogen-free stock are considered. Fee.

593 (701) U 2, 3 or 5
Individual Studies
Prereq.: Senior standing in Hort.
Special studies in the fields of fruit crops, vegetable crops, florist crops, landscape horticulture, and processing and technology of fruits, vegetables, and related crops.

H599 U 2, 3 or 5
Honors Course
Prereq.: Honors Program.
Special studies in the fields of fruit crops, vegetable crops, florist crops, landscape horticulture, and processing and technology of fruits, vegetables, and related products.

GENERAL PREREQUISITES FOR COURSES NUMBERED 600
Unless otherwise indicated, the prerequisites for 600-level courses are 15 cr. hrs. in courses in the same discipline numbered 300 or higher, or 10 cr. hrs. in courses numbered 300 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 300 or higher in specified allied disciplines.

610 U G 3
Weed Control in Horticultural Crops
Sp. 3 cl.
Prereq.: 15 cr. HORT. and 10 cr. hrs. Bot.
A study of environmental and cultural factors which influence weed development in horticultural crops and a review of the principles of chemical and mechanical weed control. Alban.

611 U G 5
Tropical and Subtropical Fruit and Vegetable Production
A. 4 cl., 2-hr. lab.
Prereq.: Senior or graduate standing, minimum of 20 cr. hrs. Biological Sciences, and Agron. 543.
A study of important tropical and subtropical fruits and vegetables, with emphasis on latest technological advances to achieve optimum quantitative and qualitative yields. Hartman and Alban.

621 (542) U G 5
Greenhouse Environment Control
A. 4 cl., 1 3-hr. lab.
Prereq.: 515; prereq. or concur. Bot. 630.
Not open to students with credit for 422.
Principles and practices of greenhouse and growth chamber operation including construction, heating, cooling, light, photoperiodism, temperature, humidity, ventilation, moisture, soils, nutrition, and pests. Kiplinger. Fee.

622 (643) U G 5
Commercial Floriculture I—Potted Plants
W. 4 cl., 1 3-hr. lab.
Prereq.: 621 and Bot. 630; prereq. or concur. Bot. 631.
Physiological principles and environmental factors in production of azaleas, begonias, bulbs, chrysanthemums, cyclamen, geraniums, hydrangeas, poinsettias, roses, saintpaulias, and other potted flowering and foliage plants. Kiplinger. Fee.

623 (645) U G 5
Commercial Floriculture II—Cut Flowers
Sp. 4 cl., 1 3-hr. lab.
Prereq.: 621 and Bot. 530; prereq. or concur. Bot. 631.
Physiological principles and environmental factors in production of asters, carnations, chrysanthemums, orchids, roses, snapdragons and other cut flower crops; analysis of production costs of crops. Kiplinger. Fee.

624 (651) U G 5
Commercial Floriculture III—Design and Marketing
Sp. 3 cl., 2 2-hr. labs.
Prereq.: 621 and Econ. 201.
Fundamentals of commercial floral design; flower shop management; principles and practices in handling, packaging, and selling florists’ crops and supplies through wholesale and retail outlets. Kiplinger and Reisch. Fee.
641 (631) U G 5
Unit Operations in Processing Fruits, Vegetables, and Related Foods I
3 cr., 2 2-credit hrs., lab.
Prereq.: 441.
Unit processes of handling, grading, cleaning, sorting, peeling, pumping, change in form, and filling as related to commercial processing of fruits, vegetables, and related products. Gould.

642 (624) U G 5
Unit Operations in Processing Fruits, Vegetables, and Related Foods II
A, 3 cr., 2 2-credit hrs.
Prereq.: 441.
Unit processes of extracting, filtering, and emulsifying, carbonating, gassing, enrobing, compounding, forming, and fortifying as related to food manufacture. Gelsman. Fee.

643 U G 5
Unit Operation in Processing Fruits, Vegetables, and Related Foods III
Sp., 3 cr., 2 2-credit lab.
Prereq.: 441.
Unit processes of milling, grinding, toasting, extruding, frying, and formulating as related to the commercial processing of potatoes, cereal strains, and related foods.

644 U G 5
Analysis of Fruits, Vegetables and Related Products
Sp., 2 1-credit, 3 2-credit hrs.
Prereq.: 442 and Chem. 102.
Fundamental principles and techniques of chemical analysis of fruits, vegetables, and products derived from them.

650 (526) U G 5
Greenhouse Vegetable Crops
A, 3 cr., 4 lab. hrs.
Prereq.: 621.
A study of the origin and development of the vegetable forcing industry and present-day cultural practices with reference to the more important greenhouse vegetable crops. Alban.

652 (622) U G 5
Advanced Vegetable Crops
Sp., 4 cr., 1 2-credit lab.
Prereq.: 460.
The culture of the principal vegetable crops, including history, plant characteristics, physiology, propagation, climatic and edaphic acaptations, and specialized production technology. Fee.

650 U G 2
Colloquia
A, W, S.
Prereq.: Senior standing.
Topic to be announced.

694 U G 2, 3 or 5
Group Studies
A, W, S.
Prereq.: Senior or grad. standing.
Special group studies in the fields of fruit crops, vegetable crops, florist crops, landscape horticulture, and processing and technology.

699 U G 2
Junior Seminar
A, W, S.
Review and interpretation of research literature.

GENERAL PREREQUISITES FOR COURSES
NUMBERED 700
Unless otherwise indicated, the prerequisites for 700-level courses are 15 cr. hrs. in courses in the same discipline numbered 400 or higher, plus additional specified course(s) numbered 600 or higher.

731 (683) U G 5
Arboriculture
A, 4 cr., 1 3-credit lab.
Prereq.: 432 and Bot. 631.
Environmental factors affecting plant growth and the planting, fertilization, pruning, cabling, and pest control practices in commercial arboriculture, city forestry, park, and industrial grounds maintenance. Reisch. Fee.

733 (550) U G 5
Management of Nursery and Garden Store Operations
Sp., 4 cr., 3-credit lab.
Prereq.: 433, 621, and Agron. 340.
Detailed consideration of factors involved in site selection and operation of commercial nurseries and garden centers; production and marketing of ornamental plants and related products. Reisch. Fee.

734 U G 5
Physiology of Ornamental Plants
Sp., 4 cr., 3-credit lab.
Prereq.: 733 and Bot. 631.
Influence and interaction of endogenous and exogenous factors on growth and development of ornamental plants. Kozel.

741 (629) U G 5
Food Regulations and Product Examination
W., 3 cr., 2 2-credit lab.
Prereq.: 241 and 442.
Food laws, regulations, grade standards, and the technical control of processed foods; interpretation of laboratory analysis for control of product quality. Gould.

794 (710) U G 2
Group Studies in the Processing of Fruits, Vegetables, and Related Food Products
Prereq.: 641, 642, and 741.
Repeatable by undergraduates to a maximum of 8 cr. hrs.
b. Processing Methodology, A. Peng.
c. Packaging Materials and Methodology, W. Gelsman.
GENERAL PREREQUISITES FOR COURSES
NUMBERED 800 AND 900
Unless otherwise indicated, the prerequisites for 800 and 900-level courses are 30 cr. hrs. in courses in the same discipline, or 20 cr. hrs. in the same discipline, plus 25 cr. hrs. in specified allied disciplines.

801 (810) G 2 or 3
Advanced Studies in Horticultural Science
Prereq.: Permission of instructor.
  b. Morphological and anatomical studies of vegetative plant parts as influenced by environment, W. Hartman.
  c. Post-harvest physiology of horticultural crops and plants, A. Kretchman.
  d. Advanced vegetable physiology, A. Alban.
  e. Advanced horticultural crop breeding, W. Brown.
  f. Fruit and vegetable processing and specialty products, A. Gould.
  g. Quality control in fruit and vegetable processing, Sp. Gould.
  h. Physiological studies in floriculture crops, A. Kiplinger.

804 G 2
Seminar
A, W.

805* (705) G 4
Seminar in the Historical Literature and Current Developments of Horticulture
A.
Prereq.: 461, 652, 622, or 731.
History and literature of horticulture from the 8th Century B.C. to the present; developments during the 20th Century emphasized; current trends appraised.

811 G 5
Advanced Plant Nutrition I—Macro-nutrients
A. 3 cr., 4 lab. hrs.
Prereq.: Bot. 631 or equiv.
Effect of major nutrient elements exclusive of calcium upon development of horticultural plants; physiology and biochemical changes occurring within plants and diagnosing deficiencies and excesses.

812 (712) G 5
Advanced Plant Nutrition II—Micro-nutrients
W. 2 cr., 2 2-hr. labs, assigned reading 1 hr.
Prereq.: Bot. 631 or equiv.
Effects of deficiencies and excesses of calcium and micro-nutrients upon growth and development of horticultural plants including techniques of detecting and correcting such condition.

897 G 1
Interdepartmental Seminar in Natural Resources
(See under Interdepartmental Seminars.)

898 G 1
Interdepartmental Seminar in Nutrition and Food Technology
Su.
(See under Interdepartmental Seminars.)

993 G 2, 3 or 5
Individual Studies
Special studies in the fields of fruit crops, vegetable crops, florist crops, landscape horticulture, and processing and technology of fruits, vegetables, and related food products.

999 (950) G Arr.
Research Thesis or Dissertation
Research for thesis or dissertation purposes only.

Hospital Administration

(School of Allied Medical Professions)
Office: 510 Means Hall, 466 West Tenth Avenue

Associate Professor Dunn (Division Director); Professors Atwell, Evans, Keller, Lachner, Malling, and Shillito; Instructors Bergman, Butts, and Vitello.

825 G 3
Hospital and Medical Care Administration
A. 3 cr.
Prereq.: Admission to Graduate Program in Hospital and Health Services Administration or permission of instructor.
Introduction to American health system; analysis of the hospital and its social role; functions and relationships of the medical staff, board of trustees and administration. Dunn, Lachner, McCoil, and Staff.

826 G 3
The Environment and Structural Components of Medical Care
A. 3 cr.
Prereq.: 825 or permission of instructor.
Analysis of the hospital environment with emphasis on components of the health care system and their interrelationships; examination of public issues, hospital planning, and hospital law. Dunn, Lachner, and Staff.

827 G 3
Foundations of Hospital Management
A. 3 cr.
Prereq.: 825 or permission of instructor.
A consideration of resource allocation within the hospital organization; application of financial management principles to the public and non-profit health service enterprise. Dunn and Staff.
Industrial Engineering

Office: 210 Systems Engineering Building, 1971 Neil Avenue

Professors Baker (Chairman), Bishop, Cerson, Edmondson (Emeritus), Lebouloy (Emeritus), Moore, Morris, Pepper, and Rockwell; Associate Professors Francis, Giffin, Kibbey, and Miller; Assistant Professors Bond, Clark, Neuhardt, and Smith; Instructors.

Foundry Practice*
Sp. 2 cl., 4 lab. hrs.
Prereq.: Ed. 2nd yr. standing or permission of chairman.
Not open to students in College of Engineering.
(Safety glasses must be worn in laboratory.)
Lecture and laboratory coverage of casting technology; bench and machine molding, core making, pouring, cleaning, and surface finishing of castings.

Machine Shop Practice*
A, Sp. 10 cl. and lab. hrs.
Prereq.: Engr. Gr. 100 or equiv., Ed. 2nd yr. standing or permission of chairman.
Not open to students in College of Engineering.
(Safety glasses must be worn in laboratory.)
Laboratory practice on basic machine tools; course objective is to develop skills and knowledge that are essential for the Industrial Arts teacher at the secondary level.

An Introduction to Industrial Engineering and Operations Research
A, Sp. 5 cl.
Prereq.: Math. 425; prereq. or concur. Math. 426.
Introduction to industrial engineering and the methods of operations analysis and operations research.

Manufacturing Engineering I
A, W, Sp. 2 cl., 6 lab. hrs.
Engr. 3rd qtr., 2nd yr. standing and permission of chairman; Division of Design, permission of chairman.
(Safety glasses must be worn in laboratory.)
Fundamentals and interrelationships of the principal manufacturing processes; laboratory work in the areas of foundry, machine tools, heat treating, and welding.

Manufacturing Engineering II
W, Sp. 3 cl., 4 lab. hrs.
Prereq.: 301 and permission of chairman.
(Safety glasses must be worn in laboratory.)
Aspects of manufacturing engineering; emphasis on economics of process choice, production planning, estimating, inspection, and scheduling in metal fabrication and assembly.
389 (630) U 2
Junior Inspection Trip
Sp. 1 wk. at end of W. Qtr.
Prereq.: Major standing in Indus. E.
A group visit to various industrial plants; students must register for the course and pay the laboratory fee at the beginning of the Spring Quarter. Fee.

406 (706) U 4
Industrial Quality Control
W, Sp. 4 cl.
Prereq.: 301 and Math. 426.
The application of probability theory, statistics, and control theory to problems in product inspection and process control; economic evaluation of quality control techniques. Neuhardt.

431 (614) U 3
Manufacturing Equipment and Methods
A. 2 cl., 2 1-hr. lab.
Not open to students in College of Engineering.
A survey including lectures, laboratory demonstrations, and field trips, to acquaint the student with industrial production methods and equipment.

485 (639) U 4
Practical Experience in an Industrial Organization
A. 10 wks. during Su. between 3rd and 4th yrs.
To be obtained in some engineering or industrial organization; the student shall present a satisfactory report upon the work done.

501 (663) U G 4
Man-Machine Systems I
A, Sp. 3 cl., 1 2-hr. lab.
Prereq.: 406.
Analysis and measurement of man-machine systems.

502 (664) U G 4
Man-Machine Systems II
A, W. 3 cl., 1 2-hr. lab.
Prereq.: 501.
Principles of experimental evaluation and prediction of production systems.

503 (771) U G 4
Man-Machine Systems Design
W, Sp. 3 cl., 1 2-hr. lab.
Prereq.: 502.
Workplace, and control and display design; integrating models of man in man-machine systems through design problems.

504 (761) U G 4
Engineering Economic Analysis
A, W. 4 cl.
Prereq.: Acc. 212 and Math. 426.
Economic analysis of engineering projects and methods of operation; introduction to the analysis of engineering decisions. Morris.

505 (709) U G 4
Production Engineering
Sp. 2 cl., 6 lab. hrs.
Prereq.: 502.
Fundamentals of production tooling and correlating with design and specifications of the product. Kibbey.

506 (708) U 5
Design of Production Systems
A, Sp. 3 cl., 2 2-hr. lab.
Prereq.: 501; concur. 502.
Integration of the methods and analytical techniques of industrial engineering into the design of a complete production system. Fee.

507 (764) U G 4
Production Programming
A, Sp. 4 cl.
Prereq.: 504 and Math. 571.
Not open to students with credit for 602.
Mathematical formulation and solution of problems of scheduling, inventory control, logistics, etc.; course covers various linear models. Bishop.

531 (667) U 3
Tool Engineering
A. 2 cl., 4 lab. hrs.
Prereq.: 301.
The design of tools, jigs, and fixtures; the basic elements of fixture design, such as form, locating points, clamping devices, and the use of standardized parts.

532 (633) U 3
Motion and Time Study
A, W. 2 cl., 1 2-hr. lab.
Prereq.: Bus. Org. 500 and 630, and Econ. 442.
Not open to students in College of Engineering.
The objectives, scope, and techniques of time study and methods analysis are considered from the standpoint of the factory and office supervisor.

534 (715) U G 4
Principles of Industrial Engineering
A, W. Sp. 4 cl.
Prereq.: 3rd yr. standing in Engr.
Not open to majors in Indus. E.
A survey of the industrial engineering phase of manufacturing with emphasis on principles and problem solving methods.

650 U G 3
Analysis for Industrial Engineers
Su. A. 3 cl.
Prereq.: Math. 426 or equiv.
Use of mathematical techniques; including finite calculus, Fourier analysis, and assorted transforms in the analysis of industrial engineering systems. Giffin.
651 U G 3
Optimization Techniques in Industrial Engineering and Operations Research
A. 3 cl.
Prereq.: 507.
Techniques for formulation and solution of single-stage and sequential constrained optimization problems, including substitution, Lagrange multipliers, Kuhn-Tucker theory, quadratic forms, global extrema, and dynamic programming. Bishop.

652 U G 3
Analysis of Inventory Systems
W. 3 cl.
Prereq.: 502.
Mathematical analysis applied to single stage inventory systems using both deterministic and probabilistic models. Giffin.

653 U G 3
Engineering Data Analysis
Sp. 3 cl.
Prereq.: 502.
Graphical and other special techniques for estimating parameters and testing goodness of fit of non-normal distributions to engineering data. Bond.

654 U G 4
Simulation of Industrial Systems
W. 3 cl., 2 lab. hrs.
Prereq.: 504 and Compu. and Info. Sc. 541; or permission of instructor.
Analysis of industrial design problems via computer simulation. Clark.

655 U G 3
System Reliability and Availability
Sp. 3 cl.
Prereq.: 502 or permission of instructor.
The prediction of system reliability and availability is studied; introduction of methods for analyzing system design concepts from the viewpoints of reliability and availability. Clark.

683 (799) U G 1-6
Individual Studies in Industrial Engineering
Prereq.: 4th yr. standing and permission of instructor.
This course is intended to give the advanced student an opportunity to pursue special studies not offered in fixed curricula.

750 (798) U G 3-18
Advanced Studies in Industrial Engineering
Prereq.: 4th yr. standing and permission of instructor.
Repeatable to a maximum of 24 cr. hrs.
The student must register for specific classes in areas as indicated below, and may register for more than one at a time.

750.01 Job Evaluation and Systems Performance Measurement
750.02 Organized Labor and Industrial Methodology
750.03 Industrial Applications for Statistics
750.04 Discrete-System Analysis and Control
750.05 Decision Theory
750.06 System Programming and Optimization
750.07 Contemporary Problems in Plant Layout and Design
750.08 Flow System Analysis
750.09 Forecasting and Estimating
750.10 Human Factors in System Design
750.11 Organization of Industrial Engineering Functions
750.12 Production Engineering
750.13 Environmental Stress Problems

811 G 3-12
Methods Engineering
Prereq.: 501 and 502.
Advanced work in one or more special phases of time study, motion study, job evaluation, wage analysis and payment systems, and speed and effort rating; the viewpoint of unions, and problems arising from labor-management relationships. Baker.

8121 G 3
Advanced Systems Design
W.
Prereq.: 650 and 652, or permission of instructor.
Advanced work in the analysis and design of production and logistic systems. Giffin.

813 G 3
Advanced Queuing Theory
Sp. 3 cl.
Prereq.: 750.08 and 650, or permission of instructor.
Mathematical analysis and design of waiting line systems emphasizing transient solutions, general arrival and service distributions, and priority queues and networks of queues. Giffin.

815 G 3
Analysis of Discrete-State Industrial Time Series
A. 3 cl.
Prereq.: Math. 520 and 571; or equiv. and permission of instructor.
Use of time series data to analyze discrete-state industrial processes. Clark.

821 G 3-12
Problems in Production Engineering
Prereq.: 505.
Advanced work in one or more phases of production engineering involving problems in production design, equipment planning, tool design, and quantity and quality control. Kibbey.

828 G 3-12
Advanced Studies in Plant Design and Materials Handling
Prereq.: 506.
Advanced work in one or more special phases of plant design and materials handling. Miller.
830 G 3
Production Programming I
A. 3 cl.
Prereq.: 842.
The application of the mathematics of linear models, determinants, simultaneous equations, and linear programming, to industrial engineering problems. Francis.

831 G 3
Production Programming II
W. 3 cl.
Prereq.: 830, or Math. 571 and permission of instructor.
The construction and application of linear optimization models for production, scheduling, and inventory problems. Francis.

832 G 3
Advanced Production Programming
Sp. 3 cl.
Prereq.: 831.
The construction and application of non-linear optimization models for production process design and control. Francis.

835 G 3
Product Development Experimentation I
W. 3 cl.
Prereq.: 830 and 842; and Math. 621 or equiv.
Application of linear statistical models to Industrial Engineering experimentation with emphasis on resource constrained investigations. Neuhardt.

836 G 3
Product Development Experimentation II
Sp. 3 cl.
Prereq.: 835.
Continuation of 835; emphasis of heavily constrained experimentation in production engineering and quality control problems. Neuhardt.

842 G 3
Operations Research I
A, W. 3 cl.
Prereq.: Calculus, probability theory and statistical methods, and permission of instructor.
Introduction to the nature and problems of operations research and the study of actual case histories in the field.

843 G 3
Operations Research II
W, Sp. 3 cl.
Prereq.: 842.
The position of the model in operations research and the study of the important techniques and formal approaches to research problems.

844 G 3
Operations Research III
Su, Sp. 3 cl.
Prereq.: 843.
Consideration of topics in operations research including research methodology in the various sciences, and the conduct of actual operations research investigations.

845 G 3
Design of Decision Networks
W. 3 cl.
Prereq.: 750.05.
Design of networks involving multiple, interacting decision makers including problems of complementarity, coordination, learning, and decentralization. Morris.

851 G 3-12
Personnel Research in Engineering Industries
Prereq.: 750.01 and 750.11.
Advanced work in one of the several phases of personnel management in engineering industries. Baker.

861 G 3-12
Research in Decision Processes
Prereq.: 504 and 507.
Advanced work in decision theory and processes including criterion research, decision making under uncertainty and in conflict situations, and gaming techniques. Morris.

862 G 3
Decision Theory
Sp.
Prereq.: 750.05 or equiv.
Introduction to normative decision models and their applications. Morris.

863 G 3
Dynamic Programming
W.
Prereq.: 651 or equiv.
Theory, methodology, and application of dynamic programming. Bishop.

864 G 3
Optimization of Dynamic Systems
Sp. 3 cl.
Prereq.: 750.04 and 863 or equiv.
Study of theory and methodology for optimum control of dynamic systems (sequential decision systems); included are calculus of variations, Pontryagin Maximum Principle, and associated approaches. Bishop.

866 G 3-12
Programming and Control Research
Prereq.: 831 or 862.
Advanced work in the several phases of programming and control theory; consists primarily of application of mathematical methods to the formulation and solution of process programming and control problems. Bishop.

871 G 3-12
Man-Machine Systems Research
Prereq.: 750.10 and 750.13.
Advanced work in special research topics in man-machine systems. Rockwell and Smith.
875 G 3
Human Factors Engineering in Vehicular Control
W, 3 cr.
Prereq.: 703.10.
Characteristic and limitations of the human controller of air craft or surface vehicles, design and evaluation of control aids, and human adaptation to control dynamic changes. Rockwell.

881 (801) (802) (903) G 2
Seminar in Industrial Engineering
Repeatable to a maximum of 6 cr. hrs.

890 G 1-5
Interdepartmental Seminar
(See under Interdepartmental Seminars.)

999 G Arr.
Research in Industrial Engineering
Research for thesis or dissertation purposes only.

Interdepartmental Seminars

797 U G P 1-5
Interdepartmental Seminars
Repeatable by permission.
Two or more departments may collaborate in presenting seminars in subjects of mutual interest; topics to be announced.

895 G 1-5
Interdepartmental Seminar in Radio Astronomy
Techniques of radio-astronomy; present state of knowledge of the universe as determined by radio-astronomy; given cooperatively by the Departments of Astronomy and Electrical Engineering, Ko, Kraus, and Slettebak.

896 G 1-3
Interdepartmental Seminar in Polar and Alpine Studies
Sp, 1-3 hr. cl.
Permission of instructor.
Repeatable to a maximum of 9 cr. hrs.
A seminar on selected topics involving anthropology, biology, climatology, exploration, geology, glaciology, microbiology, and soil; given cooperatively by the Institute of Polar Studies, Biological Sciences, and the following departments: Agronomy, Anthropology, Civil Engineering, and Geography.

897 G 1
Interdepartmental Seminar in Natural Resources
Repeatable to a maximum of 9 cr. hrs.
A seminar in natural resources conservation; given cooperatively by the Natural Resources Institute, Biological Sciences, and the following departments: Agronomy, Agricultural Economics and Rural Sociology, Agricultural Engineering, Geography, Horticulture and Forestry, and Plant Pathology.

898 G 1
Interdepartmental Seminar in Nutrition and Food Technology
3 cr.
A seminar in nutrition and in related fields of food technology; given cooperatively by the Institute of Nutrition, Biological Sciences, and the following departments: Animal Science, Dairy Science, Dairy Technology, Home Economics, Horticulture and Forestry, Physiological Chemistry, Plant Pathology, Poultry Science, and Preventive Medicine.

999 G 1-5
Interdepartmental Seminars
Repeatable by permission.
Two or more departments may collaborate in presenting seminars on subjects of mutual interest; topics to be announced.

International Studies

Office: 100 University Hall, 216 North Oval Drive

Professors Nemzer (Political Science) (Chairman), Fisher (History), Bourguignon (Anthropology), Dynes (Sociology), Hausman (Fine Arts), and B. Latkin (Romance Languages); Associate Professors Buchanan (Education) and Underwood (Journalism); Assistant Professors Kresky (Slavic Languages), Withuhn (Geography), Michael (Economics), and Axline (Political Science).

100 (410) U 5
Basic Issues in World Affairs
A, W, 3 cr.
General introduction to contemporary international problems, conducted cooperatively by members of several departments.

230 (540) U 5
Introduction to the Soviet Union
A, W, Sp, 5 cr.
A survey of the land, people, history, politics, social institutions, literature, and arts of the Soviet Union, conducted by members of several departments. Nemzer.

235 (520) U 5
Introduction to China and Japan
A, W, Sp, 5 cr.
Interdepartmental survey of contemporary Asian civilization; geographic and racial background, historical and cultural heritage, social organizations, economic and political problems, and international relations.

240 U 5
Introduction to Latin America
A, W, Sp, 5 cr.
An interdisciplinary survey of Latin American society, anthropology, economics, history, literature, geography, and agriculture.
245  U  5
Introduction to the Modern Middle East
Sp.  5 cl.
Interdepartmental survey of the land, people, history, politics, religions, philosophy, social institutions, economic development, and literature and the arts conducted by members of several departments. Fisher.

250  U  5
Introduction to Africa
W, Sp.  5 cl.
Interdepartmental survey of the land, people, history, politics, social institutions, economic development, literature and the arts conducted by members of several departments.

501  (601)  U  6  G  5
Selected Problems in International Studies
W.  2 cl.
Prereq.: Pol. Sc. 345 or equiv.
Open only to Internat. S. majors or students with equiv. preparation.
Panel discussions, informal conferences, and a reading and research program arranged to meet the special needs of those enrolled. Nemzer.

H735  (705)  U  3-5
Honors Course
Prereq.: Senior standing and 40 cr. hrs. in the social sciences including 15 cr. hrs. in courses acceptable for a major in Internat. S., with a grade of A in at least half of these major courses and an average of B in the remainder. Permission of instructor and Honors Committee of the College.
Repeatable to a maximum of 15 cr. hrs.
Informal conferences to allow full scope of the initiative of the student. A special topic is assigned to each student. The results are tested by conferences and special reports. Minimum grade of B required for special honors credit.

Italian

Office: 248 Diehl Cunz Hall of Languages, 1841 Millikin Road

Professors Bulatkin (Chairman) and Griffin; Associate Professor Mancini; Assistant Professors Angelo and Cassell; Instructor Alessia.

101  (401)  U  5
Elementary Italian
Su, A, W, Sp.  5 cl.
Not open to students who are not eligible to take Engl. 101. May not be taken concur. with French 101-102, Port. 101-102, or Span. 101-102. Credit in 101 will be counted toward graduation only if followed by successful completion of 102, or if taken after successful completion of the fourth regular university course in another foreign language.
Elements of Italian grammar with oral and written exercises; attention to ear training and oral practice; elementary reading based on Italian geography, history, and customs.

102  (402)  U  5
Elementary Italian
Su, A, W, Sp.  5 cl.
Prereq.: 101.
May not be taken concur. with French 101-102, Port. 101-102, or Span. 101-102.
The elements of Italian grammar with abundant oral and written exercises; development of conversational skill; reading, vocabulary building, attention to Italian idioms; modern Italian prose.

103  U  5
Intermediate Italian
Su, A, W, Sp.  5 cl.
Prereq.: 102.
Review of Italian grammar; reading of short stories and plays; increased attention to development of oral and written proficiency.

104  U  5
Intermediate Italian
Su, A, W, Sp.  5 cl.
Prereq.: 103 or 112.
Intensive practice in oral and written Italian; reading of Italian plays, short stories, and nonfiction of cultural and historical importance; grammar and idiom review.

112  U  5, 10, 15
Intensive Italian
Su.  15 cl. Enrollment limited to 20 students.
Prereq.: Permission of chairman.
Full time of student and full fees required.
Equiv. of 101, 102, and 103.
Students with credit for 101 or the equiv. may not register for more than 10 cr. hrs. Students with credit for 101 and 102 or the equiv. may not register for more than 5 cr. hrs. Students with credit for 103 or the equiv. may not register for credit.
Elementary and intermediate Italian; intensive drill in forms, syntax, vocabulary, and idiom; reading of short stories and plays in Italian.

202  (510)  U  5
Italian Conversation and Composition
Sp.  5 cl.
Prereq.: 104 or permission of instructor.

271  U  3
Italian Literature in English Translation: 14th Century
W.  3 cl.
Not open to majors in Ital.
Reading and interpretation of selections from Dante's Divine Comedy, Petrarch's Canzoniere, and Boccaccio's Decameron; discussion of their relation to the Middle Ages and the Renaissance.

272  U  3
Italian Literature in English Translation: 15th and 16th Centuries
Sp.  3 cl.
Not open to majors in Ital.
Readings in such authors as Leonardo, Cesare Borgia, Machiavelli, Ariosto, Tasso; discussion of their place in the Renaissance.
273 U 3
Italian Literature in Translation: Modern
Sp. 3 cl.
Not open to majors in Ital.
Intellectual and literary trends from the end of the 19th century to the present; works by Verga, Svevo, Pirandello, Silone, and Moravia.

401 U 3
Review Grammar and Composition
W. 3 cl.
Prereq.: 104 or permission of instructor.
Review of Italian grammar; composition on assigned topics and practice in translation.

402 U 5
Intermediate Italian Conversation and Composition
Sp. 5 cl.
Prereq.: 104 or permission of instructor.
Vocabulary building, practice in speaking Italian, and composition dealing with various aspects of present-day Italian life.

404† U 5
Italian Pronunciation
A. 5 cl.
Prereq.: 104 or permission of instructor.
Standard Italian pronunciation; lectures and practice with corrective exercises; use of phonetic symbols.

421 (503) U 5
Contemporary Italian Drama
W. 5 cl.
Prereq.: 104 or permission of instructor.
Reading and analysis of representative plays of such authors as Pirandello, Betti, and DeFilippo.

422 (504) U 5
Contemporary Italian Poetry
Sp. 5 cl.
Prereq.: 104 or permission of instructor.
Reading and analysis of poems representing the principal tendencies of contemporary Italian poetry with emphasis upon Montale, Ungaretti, and Quasimodo.

423 (505) U 5
Contemporary Italian Fiction
A. 5 cl.
Prereq.: 104 or permission of instructor.
Narrative prose in Italy since the end of the Second World War; selected readings from such authors as Moravia, Vittorini, Pavese, and Cassola.

601 U G 5
Modern Italian Syntax
Sp. 5 cl.
Prereq.: 401 or permission of instructor.
Alessia.

603† U G 5
Advanced Italian Conversation and Composition
A. 5 cl.
Prereq.: 401 or 402, or permission of instructor.
Intensive practice in speaking and writing, based on contemporary usage.

604† U G 3
Italian Phonetics
W. 2 cl., 1 hr. lab.
Prereq.: 404 or permission of instructor.
Training in auditory and oral aspects of Italian pronunciation; analysis of the phonetic structure of modern Italian.

621* (611) U G 5
Dante
W. 5 cl.
Prereq.: 10 cr. hrs. at the 400 level or permission of instructor.
Introduction to the reading of the Divine Comedy; analysis of major episodes. Cassell.

622* (612) U G 5
Petrarch and Boccaccio
W. 5 cl.
Prereq.: 10 cr. hrs. at the 400 level or permission of instructor.
Historical and aesthetic analysis of Petrarch's poetry; Petrarchism as a European phenomenon; literary background of Boccaccio's prose and verse; reading from the Decameron. Cassell.

623* (613) U G 5
Modern Italian Literature
A. 5 cl.
Prereq.: 10 cr. hrs. at the 400 level or permission of instructor.
Italian literature from 1860 to 1920; Forsolo, Leopardi, Manzoni, Verga, Svevo, Carducci, and Pascoli.

624* U G 5
Contemporary Italian Literature
A. 5 cl.
Prereq.: 10 cr. hrs. in Ital. literature at the 400 level or permission of instructor.
Intensive study of fiction, poetry, and drama from such authors as Moravia, Pavese, Montale, Quasimodo, Pirandello, and Betti. Cassell.

625* U G 5
Italian Literature of the Renaissance
Sp. 5 cl.
Prereq.: 10 cr. hrs. in Ital. literature at the 400 level or permission of instructor.
Readings in works of representative authors of the 15th and 16th centuries such as Leonardo, Michelangelo, Castiglione, Machiavelli, Ariosto, and Tasso, Mancini.

626* U G 5
Italian Literature of the 17th and 18th Centuries
Sp. 5 cl.
Prereq.: 10 cr. hrs. in Ital. literature at the 400 level or permission of instructor.
Readings in selected works of Campanella, Marino, Galilei, Metastasio, Vico, Goldoni, Parini, and Alfieri.

694 U G 1-15
Group Studies in Italian
Prereq.: Permission of instructor.
Repeatable to a maximum of 30 cr. hrs.
722* U G 3
Studies in Italian Literature: 14th Century
Sp. 3 cl.
Prereq.: Grad. students, and by permission of
instructor to seniors majoring in Italian, with credit for
621, 622, or equiv.
Intensive study of one author, major work, or topic
such as historiography, pomo poetry, the Vita Nova;
readings in relevant criticism and scholarship.
Cassell.

725† U G 3
Studies in Italian Literature:
15th and 16th Centuries
A. 3 cl.
Prereq.: Grad. students, and by permission of instructor
to seniors majoring in Italian, with credit for 625 or equiv.
Intensive study of one author, major work, or topic
such as epic poetry, the Courtier, Poliziano; readings
in relevant criticism and scholarship. Mancini.

726* U G 3
Studies in Italian Literature:
17th and 18th Centuries
A. 3 cl.
Prereq.: Grad. students, and by permission of instructor
to seniors majoring in Italian, with credit for 626 or equiv.
Intensive study of one author, major work, or topic
such as baroque poetry, Tassoni, Alinari's theatre;
readings in relevant criticism and scholarship.
Mancini.

811 G 3
History of the Italian Language: Introduction
Sp. 3 cl.
Prereq.: M.A. candidates in Italian, others by permission
of instructor.
Basic concepts of historical linguistics; the major
factors of change in the history of the Italian language
from the Roman times to the present. Griffin.

831† G 2-5
Seminar in Italian Literature
A.
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.

832† G 2-5
Seminar in Italian Literature
W. 2 or 5 cl.
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.

833† G 2-5
Seminar in Italian Literature
Sp. 2 or 5 cl.
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.

885† G 5
Introduction to Methods in the History
and Criticism of Literature
A. 4 or 5 cl.
Selected readings in basic literary history, criticism,
and theory, with practice in the use of standard
bibliographical aids to scholarship.

993 G 1-5
Individual Studies in Italian
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.

994 G 1-15
Group Studies in Italian
Prereq.: Permission of instructor.
Repeatable to a maximum of 30 cr. hrs.
Investigation of minor problems in the various fields
of Italian literature and language.

999 (950) G Arr.
Research in Italian Language or Literature
Research for thesis or dissertation purposes only.

Japanese

Office: 276 Dieter Cunz Hall of Languages, 1841
Millikin Road

Associate Professor Ching (Chairman); Professor
Fillmore; Assistant Professor Okuda; Instructors
Kawai and Wright.

101 (401) U 5
Elementary Modern Japanese
A, W. 5 cl.
Elements of Standard Colloquial Japanese grammar,
with intensive oral and written exercises; introduction
to the Japanese writing system (hiragana, katakana,
and kanji). Kawai.

102 (402) U 5
Elementary Modern Japanese
W, Sp. 5 cl.
Prereq.: 101.
Continuation of 101. Kawai.

103 (403) U 5
Elementary Modern Japanese
A, Sp. 5 cl.
Prereq.: 102.
Continuation of 102. Kawai.

104 (404) U 5
Intermediate Modern Japanese
A. 5 cl.
Prereq.: 103 or permission of instructor.
Elements of Japanese grammar; intensive practice in
oral and written Japanese; reading of texts and
105 (505) U 5
Intermediate Modern Japanese
W. 5 cl.
Prereq.: 104 or permission of instructor.
Not open to students with credit for 405.
Continuation of 104. Kawai.

106 (506) U 5
Intermediate Modern Japanese
Sp. 5 cl.
Prereq.: 105 or permission of instructor.
Not open to students with credit for 406.
Continuation of 105. Kawai.

231 U 5
Elements of Japanese Culture
Sp. 5 cl.
Taught in English.
Not open to students with credit for 271.
A survey of literature, art, religion, philosophy, and
social institutions of the Japanese people from the
earliest to the most recent times. Wright.

251 U 3
Classical Japanese Literature in Translation
A. 3 cl.
A lecture and reading course in masterpieces of
Japanese literature from the 8th to the 19th century.
Wright.

252 U 3
Modern Japanese Literature in Translation
W. 3 cl.
Japanese literature from early 19th century Western
influences to present day; emphasis on the novel
from Futabata Shime to Mishima Yukio; modern poetry
and drama. Wright.

501 U 5
Classical Japanese I
A. 5 cl.
Prereq.: 106 or permission of instructor.
Not open to students with credit for 651.
A reading of classical literary works such as Hojoki,
Uji Shui Monogatari, as well as waka poetry. Wright.

502 U 5
Classical Japanese II
W. 5 cl.
Prereq.: 501 or permission of instructor.
Continuation of 501. Wright.

503 U 5
Classical Japanese III
Sp. 5 cl.
Prereq.: 502 or permission of instructor.
Continuation of 502.

507 U G 3
Advanced Modern Japanese I
A. 3 cl.
Prereq.: 106 or permission of instructor.
Not open to students with credit for 609.
Reading of contemporary prose and verse, presentation
of oral and written reports, drill in pronunciation,
practice in translation and composition. Okuda.

508 U G 3
Advanced Modern Japanese II
W. 3 cl.
Prereq.: 507 or permission of instructor.
Not open to students with credit for 610.
Continuation of 507. Okuda.

509 U G 3
Advanced Modern Japanese III
Sp. 3 cl.
Prereq.: 508 or permission of instructor.
Not open to students with credit for 611.
Continuation of 508. Okuda.

612* (517) U G 15
Study Tour of Japan
Sp. 15 cl., 2 wks. at OSU; 8 wks. in Japan.
Prereq.: 25 cr. hrs. of Japanese or permission of
instructor.
Advanced work in conversation and reading in order
to prepare for the tour. In Japan only Japanese will be
spoken; some formal instruction will be given daily
by the tour leaders.

680* U G 3
Introduction to Japanese Linguistics
A. 3 cl.
Prereq.: 103 and Ling. 601, or permission of instructor.
An introduction to phonology, syntax, and lexicon of
the Japanese language.

681 U G 3
History of the Japanese Language
A. 3 cl.
Prereq.: 103 and Ling. 601, or permission of instructor.
A survey of the development of the Japanese language
from early times to the present. Okuda.

693 (695) U G 1-5
Individual Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Not a substitute for regular language courses.
Meets individual research needs of students in area
studies and East Asian programs.

694 U G 1-5
Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Not a substitute for regular language courses.
Investigation of minor problems in Japanese language
and literature.
Japanese Phonology
W 3 cl.
Prereq.: 680, 681, or permission of instructor.
Not open to students with credit for 624.
An analysis of the phonological structure of present-day
Japanese with a critical examination of traditional and
contemporary works on Japanese phonology. Okuda.

Honors Course
Prereq.: 4th year standing; a record of A in at least
half of all Japanese courses taken and an average of
B in all courses; permission of instructor under whose
supervision the work is to be completed and College
Committee on Honors.
Open only to candidates for B.A. in Japanese.
Repeatable to a maximum of 15 cr. hrs.
A program of reading arranged for each student, with
individual conference, reports, and honor thesis.

Japanese Syntax
Sp 3 cl.
Prereq.: 680, 681, or permission of instructor.
Not open to students with credit for 626.
A survey of the grammatical structures of present-day
Japanese; presentation of syntactic rules within the
model of transformational grammar. Fillmore.

Journalism
Office: 105 Journalism Building, 242 West 18th Avenue
Professors Hall (Director), Cullman, Maguire, Pollard
(Emeritus) and Rarick; Associate Professors Clarke,
Gould, Holsinger, Norton, Peterson, Seifert, Toran, and
Underwood; Assistant Professors Bostwick, Drenten,
Gaumer, Harress, Hudson, Laufer, Mullins, and
Schaeffer; Instructors Brian, Cote, and Rogers.

Introduction to Mass Communication
Su, A, W, Sp. 3 cl.
Prereq.: Eng 101.
An introduction to newspapers, magazines, radio,
television, public relations, and other mass media.

The Art of Communication
Su, A, W, Sp. 5 2-hr. lec./labs.
Prereq.: 101, typing ability required.
Reporting and writing for newspapers, magazines, and
electronic media.

News Writing
Su, A, W, Sp. 1 cl., 2 2-hr. labs.
Prereq.: 201.
Continuation of 201 with emphasis on more
complicated reporting and news writing.

Photojournalism
Su, A, W, Sp. 2 cl., 1 2-hr. lab.
Prereq.: 201.
Reporting the news with a camera; how to recognize,
develop, and create picture stories; experience in
coordinating words and news pictures; picture
editing; layout.

Editing
Su, A, W, Sp. 2 cl., 2-hr. lab.
Prereq.: 201.
Editing of copy, headline writing, re-writing, and
general copy desk work.

The Graphics of Communication
Su, A, W, Sp. 2 cl., 2 2-hr. labs.
Prereq.: 201 or permission of instructor.
An introduction to the functions of visual and graphic
communication in news in the print and electronic
media, involving creative typography, photography, and
perception.

Reporting for Radio and Television
Su, A, W, Sp. 2 cl., 1 2-hr. lab.
Prereq.: 202, 203, and 211.
Not open to students with credit for 611.
A study of ethical, aesthetic, and technical problems
in broadcast news reporting; use of audio-visual
materials, instruments, and techniques.

Journalism Laboratory—News Editorial
No more than a total of 4 cr. hrs. may be earned in any
combination of decimal subdivisions of 421 and 422.
Not open to students with more than 6 cr. hrs. in 621.
Reporting, editing and photojournalism, primarily for
The Lantern.

421.01 Reporting
Prereq.: 202, 204, and 211.

421.02 Editing
Prereq.: 202, 204, and 211.

421.03 Photojournalism
Prereq.: 202, 203, 204, 211, and permission of
instructor.

Journalism Laboratory—Broadcasting
Prereq.: 411 or permission of instructor.
No more than a total of 4 cr. hrs. may be earned in any
combination of decimal subdivisions of 421 and 422.
Not open to students with more than 6 cr. hrs. in 621.
Reporting and editing news primarily for broadcast
news programs produced by the School of Journalism.

422.01 Radio

422.02 Television
555   U G 5
Factual Writing
Su, A, W, Sp.  5 cl.
Prereq.: Engl. 103 or equiv.
Not open to students majoring in Jour.
Gathering and writing factual material; research interviewing, critical analysis, and rewriting are stressed.
555.01 Agriculture
555.02 Home Economics
555.03 Nursing
555.04 Dental-Medical
555.05 General

602   (612)   U G 3
Magazine Writing
Su, A, W, Sp.  3 cl.
Prereq.: 202 or permission of instructor.
Non-fiction writing for publication in general, professional, trade, or Sunday magazines with emphasis on the full-length magazine article.

605   (517)   U G 4
The Development of the Mass Media in America
Su, A, W, Sp.  4 cl.
Prereq.: Junior, Senior, or Grad. standing.
Not open to students with credit for 205.
Major currents and trends basic in the shaping of the mass media; famous personalities, foundations, and evolution of a free, responsible press.

607   (714)   U G 4
Law of the Press, Radio, and Television
Su, A, W, Sp.  4 cl.
Prereq.: Junior, Senior, or Grad. standing.
Not open to students with credit for 206.
History, principles, and provisions of the law of libel, slander, copyright, and other statutes affecting newspapers, other publications, and broadcasting.

612   (607)   U G 3
Special Radio and Television News Programs
Su, A, W, Sp.  2 2-hr. lec. labs.
Prereq.: 422.01 and 422.02.
Planning and production of special news programs; such as the sports cast, the interview, special events, and documentaries.

The Supervision of Journalism in Secondary Schools
(See Ed. 614.)

624   (621)   U G 3
The Editorial Page
Su, A, W, Sp.  1 3-hr. cl., conf. arr.
Prereq.: Jour. 4th yr. standing or permission of instructor.
Study of the purpose, form, style, and spirit of the editorial; consideration of current events, practice in news interpretation, and other editorial writing.

625   (699)   U G 3
Investigative Reporting
Su, A, W, Sp.  1 3-hr. cl., conf. arr.
Prereq.: Jour. 4th yr. standing or permission of instructor.
Intensive reporting and writing.

626   U G 5
Newspaper Management, Circulation, and Advertising
Su, A, W, Sp.  4 cl., 3-hr. labs.
Prereq.: Jour. 4th yr. standing or permission of instructor.
Consideration of the tasks and problems of newspaper management with emphasis on circulation policies and methods and those affecting advertising.

627   U G 3
Advanced Editing
Su, A, W, Sp.  1 lec., 2 2-hr. labs.
Prereq.: Jour. 3rd yr. standing or permission of instructor.
Advanced theory and practice in news selection, preparation and display for newspaper, magazine, broadcast and photo-journalism media; emphasis on the responsibility of the journalist.
627.01 News-Editorial
627.02 Radio-Television
627.03 Photojournalism
627.04 Magazine

631   (617)   U G 3
Public Relations Principles
Su, A, W, Sp.  3 cl.
Prereq.: Junior, senior, or grad. standing.
Origin and development of public relations, including ethical standards and functional role in modern society; basic principles of public relations theory, philosophy, and operation.

632   (618)   U G 3
Case Studies in Public Relations
Su, W.  3 cl.
Prereq.: Junior, senior, or grad. standing.
Specific case studies designed for internal and external audiences; organization, administration of programs and departments; analysis of techniques, channels, media, and applicable research methods.

633   (619)   U G 3
Public Relations Practice
A, Sp.  2 2-hr. cl.
Prereq.: 631 or 632.
Open only to declared Jour. seniors or grad. students.
Application of principles to specific public relations problems.
641 (505) U G 3
Reporting Public Affairs
Su, A, W, Sp. 2 cl., 1 2-hr. lab.
Prereq.: Junior, senior, or grad. standing in Journ.
Instruction and practice in reporting the news of
government, the courts, politics, education, finance,
tergovernmental relations, political public opinion,
and urban affairs.

642 (608) U G 4
The Mass Media, Society, and Basic Issues
Su, A, W, Sp. 1 cl., 1 2-hr. seminar.
Prereq.: Senior or grad. standing, or permission of
instructor.
Study and analysis of basic issues behind news events
of media performance and audience reaction.

643 U G 4
The World Press
Su, A, W, Sp. 3 cl., conf. arr.
Prereq.: Senior or grad. standing or permission of
instructor.
An analysis of newspapers, news agencies, and
broadcast news outlets and their roles in the
political, economic and cultural development of their
countries.

651 (624) U G 4
Mass Media Research and Theory
W. 4 cl.
Prereq.: Senior or grad. standing or permission of
instructor.
Theories of mass communication, including models
based on examination theory, learning theory, attitude
theory, and sociocultural theory; field studies,
experiments, and content analysis.

653 (771) U G 1-5
Individual Studies in Journalism
Prereq.: Journ. 4th yr. or grad. standing.
No more than 5 cr. hrs. for undergrad. and 6 cr. hrs.
for grad. students may be earned in any combination
of decimal subdivisions.
Students make extensive and significant studies in the
field of Journalism.

653.01 News-Editorial
653.02 Radio and Television
653.03 Photojournalism
653.04 Magazines
653.05 Public Relations

654 U G 1-15
Group Studies
Repeatable to a maximum of 25 cr. hrs.
Regular class meetings and group discussions of
specified problems.
a. Mass Media and Black America.
b. International Journalism Tour.

783 (700) U 3-5
Honors Course
Prereq.: Junior standing, a grade of A in half of the
major courses and a B in the remainders; permission
of Director of the School of Journalism and the
College Committee on Honors.
Repeatable to a maximum of 15 cr. hrs.
A program for students who are candidates for a
degree with distinction in journalism.

801 (802) G 4
Seminar in Journalism
Integrated reading and research in the fields of
Journalism.
b. Theories of Mass Communication.

c. Communication Research Methods.
d. Theories of Mass Communication.

d. Communication Research Methods.
e. Theories of Mass Communication.

802 (803) G 4
Seminar in Journalism
Integrated reading and research in the fields of
Journalism.
b. History of Mass Media.
c. Legal Problems in Communication.
d. Literature and Journalism.

e. People, Society, and Mass Media.
f. History of Mass Media.
g. Legal Problems in Communication.
h. Literature and Journalism.

803 (804) G 4
Seminar in Journalism
Integrated reading and research in the fields of
Journalism.
b. Problems in Radio-Television Journalism.
c. Problems in Photojournalism.
d. Problems in Magazine Journalism.
e. Problems in Public Relations.

811 G 5
The Foreign Press
A. 2 2½-hr. seminars.
Prereq.: Grad. standing and permission of Director
of the School of Journalism and fluency in at least one
foreign language spoken in student's area of
specialization.
A comparative study of news systems in the foreign
mass media in major world areas, showing them as
products of specific political, economic and social
philosophies.

812 G 5
International Communications
W. 2 2½-hr. seminars.
Prereq.: Grad. standing and permission of Director
of the School of Journalism and fluency in at least one
foreign language spoken in student's area of
specialization.
Practices of journalism throughout the world and
their role in hindering or advancing the international
dissemination of news; manipulative communication
between nations.
813 G 5
Foreign Correspondence
Sp. 2 2½-hr. seminars.
Prereq.: Grad. standing and permission of Director of the School of Journalism and fluency in at least one foreign language spoken in student's area of specialization.
Analysis of international developments as reported in world press media as to their origins, issues, and likely evolution.

899 G 1-5
Interdepartmental Seminar
(See under Interdepartmental Seminars.)

911 G 5
Foreign Internship
Prereq.: 811, 812, 813, and permission of Director of the School of Journalism.
Repeatable to a maximum of 20 cr. hrs.
Students will spend from two to four quarters abroad, associated with newspapers, news agencies, broadcast outlets, news magazines, or universities.

999 (950) G Arr.
Research in Journalism
Research for thesis purposes only.

Landscape Architecture

(School of Architecture)
Office: 100 Brown Hall, 190 West 17th Avenue
Associate Professor Tobey; Instructors.

200 (550) U 5
Design of Gardens and Small Properties
Sp. 2 cl., 9 lab. hrs.
Landscape design for non-professional student emphasizing the design, construction, and planting of residential properties. Tobey.

201 (507) U 3
History of Landscape Architecture
A. 3 cl.
A critical and historical analysis of the organization of outdoor space to meet varying needs of man from ancient times to the Renaissance. Tobey.

202 (508) U 3
History of Landscape Architecture
W. 3 cl.
A critical and historical analysis of the organization of outdoor space from the Renaissance to the present; emphasis on the landscape architect's role in public service. Nieman.

203 (509) U 3
History of Landscape Architecture
Sp. 3 cl.
The role of the landscape architect in developing the contemporary urban and natural environment. Tobey.

211 U 6
Elementary Landscape Design
A. 1 cl., 15 lab. hrs.
Prereq.: Arch. 113.
Design of simple outdoor spaces as they relate to natural and cultural environment. Rock.

212 U 6
Elementary Landscape Design
W. 1 cl., 15 lab. hrs.
Prereq.: 211.
Continuation of 211. Rock.

213 U 6
Elementary Landscape Design
Sp. 1 cl., 15 lab. hrs.
Prereq.: 212.
Continuation of 212. Rock.

221 (587) U 3
Landscape Construction
A. 1 cl., 6 lab. hrs.
Prereq.: Land. Arch. 3rd yr. standing.
Interpretation of topography; problems in the development of ground forms, in road alignment, and construction. Rock.

222 (588) U 3
Landscape Construction
W. 1 cl., 6 lab. hrs.
Prereq.: 221.
Continuation of 221. Rock.

223 (589) U 3
Landscape Construction
Sp. 1 cl., 6 lab. hrs.
Prereq.: 222.
Continuation of 222. Rock.

300 U 3
Outlines of Landscape Architecture
W. 3 cl.
Prereq.: 4th yr. standing or permission of instructor.
Not open to candidates for the Bachelor of Land. Arch. degree.
Principles of site planning; methods of space organization using land forms, and structural and plant materials; the relationship of natural and cultural characteristics of the environment.

501 U 3
Landscape Architecture Seminar
Sp. 3 cl.
Prereq.: 502.
Research, discussion, and exercises pertinent to landscape architecture and related fields. Rock.
511  U 6
Intermediate Landscape Design
A.  1 cl., 15 lab. hrs.
Prereq.: 213.
Design of complex outdoor spaces as they relate to natural and cultural environment. Nieman.

512  U 6
Intermediate Landscape Design
W.  1 cl., 15 lab. hrs.
Prereq.: 511.
Continuation of 511. Nieman.

513  U 6
Intermediate Landscape Design
Sp.  1 cl., 15 lab. hrs.
Prereq.: 512.
Continuation of 512. Nieman.

521  U 3
Landscape Construction
A.  1 cl., 6 lab. hrs.
Prereq.: 223.
Site analysis and planning. Nieman.

522  U 3
Landscape Construction
W.  1 cl., 6 lab. hrs.
Prereq.: 521.
Continuation of 521. Nieman.

611  (617)  U 6
Intermediate Landscape Design
A.  1 cl., 15 lab. hrs.
Prereq.: Land. Arch. 4th yr. standing and Arch. 213.
An intermediate course in design with original problems involving outdoor space such as residential properties, working drawings, specifications, and estimates. Rock.

612  (618)  U 6
Intermediate Landscape Design
W.  1 cl., 15 lab. hrs.
Prereq.: 611.
Continuation of 611. Rock.

613  (619)  U 6
Intermediate Landscape Design
Sp.  1 cl., 15 lab. hrs.
Prereq.: 612.
Continuation of 612. Rock.

621  (687)  U 4
Landscape Construction
A.  1 cl., 9 lab. hrs.
Prereq.: 223.
Study of the use of materials in the construction of structural elements in landscape design; preparation of working drawings, specifications, and estimates. Rock.

622  (688)  U 4
Landscape Construction
W.  1 cl., 9 lab. hrs.
Prereq.: 621.
Continuation of 622. Rock.

623  (689)  U 4
Landscape Construction
Sp.  1 cl., 9 lab. hrs.
Prereq.: 622.
Continuation of 622. Rock.

661  (627)  U 3
Planting Design
A.  1 cl., 6 lab. hrs.
Prereq.: Land. Arch. 3rd yr. standing.
Not open to students with credit for (727).
A study of the use of plant material in landscape design with particular emphasis on composition and ecology. Tobey.

662  (628)  U 3
Planting Design
W.  1 cl., 6 lab. hrs.
Prereq.: 661.
Not open to students with credit for (728).
Continuation of 661. Tobey.

663  (629)  U 3
Planting Design
Sp.  1 cl., 6 lab. hrs.
Prereq.: 662.
Not open to students with credit for (729).
Continuation of 662. Tobey.

693  U G 2-10
Individual Studies in Landscape Architecture
Prereq.: Land. Arch. 4th or 5th yr. standing and permission of division.
Repeatable to a maximum of 30 cr. hrs.
For students in the Graduate School and those who wish to pursue special studies in landscape architecture.

711  (717)  U 6
Advanced Landscape Design
A.  1 cl., 15 lab. hrs.
Prereq.: Land. Arch. 5th yr. standing and 613.
The integration of landscape construction and planting design in the development of problems in advanced landscape design; individual research and criticism. Nieman.

712  (718)  U 6
Advanced Landscape Design
W.  1 cl., 15 lab. hrs.
Prereq.: 711.
Continuation of 711. Nieman.
713 (719) U 6
Advanced Landscape Design
Sp. 1 cl., 15 lab. hrs.
Prereq.: 712.
Continuation of 712. Nieman.

721 (787) U 4
Advanced Landscape Construction
A. 1 cl., 9 lab. hrs.
Prereq.: 623.
Theory and methods, codes and specifications pertaining to advanced landscape construction, and preparation of working drawings. Nieman.

722 (788) U 4
Advanced Landscape Construction
W. 1 cl., 9 lab. hrs.
Prereq.: 721.
Continuation of 721. Nieman.

723 (789) U 4
Advanced Landscape Construction
Sp. 1 cl., 9 lab. hrs.
Prereq.: 722.
Continuation of 722. Nieman.

750 (759) U 3
Professional Practice
W. 3 cl.
Prereq.: Land. Arch. 5th yr. standing and 623.
A study of professional practice including ethics, office organization, and the preparation of contracts and specifications. Tobey.

050 (412) U 5
Latin Review
A. 5 cl.
Prereq.: Placement test.
Credit will not be counted toward graduation.
For those students whose elementary Latin will begin with a review and continue as a preparation for Latin 103.

101 (401) U 5
Elementary Latin
A, W. 5 cl.
Not for students who have studied Latin. Credit in 101 will be counted toward graduation only if followed by successful completion of 102, or if taken after successful completion of the fourth regular University course in another foreign language.

102 (402) U 5
Elementary Latin
W, Sp. 5 cl.
Prereq.: 101.

103 (404) U 5
Intermediate Latin
A, W, Sp. 5 cl.
Prereq.: 2 yrs. of secondary school Latin, or 102, or 050.
Intermediate readings with emphasis on prose authors of the 1st century B.C.

104 (405) U 5
Intermediate Latin
A, W, Sp. 5 cl.
Prereq.: 3 yrs. of secondary school Latin, or 103, or 112.
Intermediate readings with emphasis on the poetry of the Augustan Age.

112 (415) U 5, 10, 15
Intensive Introduction to Latin
Su. 10 cl. and 10 or more hrs. of supervised study.
Full time of student and full fees required. Eqiv. of 101, 102, and 103. Students with credit for 101 or the equiv. may not register for more than 10 cr. hrs.
Students with credit for 101 and 102 or the equiv. may not register for more than 5 cr. hrs. Students with credit for 103 or the equiv. may not register for credit.

200 (406) U 5
Odes and Epodes of Horace
Sp. 5 cl.
Prereq.: 104 or equiv. in secondary school Latin.

201 (407) U 5
Livy's History of Rome
A. 5 cl.
Prereq.: 104 or equiv. in secondary school Latin.

202 (408) U 5
Latin Comedy
W. 5 cl.
Prereq.: 104 or equiv. in secondary school Latin.
Selected plays of Plautus and Terence.

Latin
Office: 217 Derby Hall, 154 North Oval Drive
Professors Morford (Chairman), Abbott, Babcock, Forbes, and Titchener (Emeritus); Associate Professors Cleary and Lenardon; Assistant Professors Davis, Hahn, Schlam, Shumaker, and Snyder.

Also see Classics.

Students with two years of high school Latin should enroll in Latin 103; with three years of high school Latin, including Cicero, in Latin 104; with three years of high school Latin, including Vergil, in 103 and 201. Latin majors should consult the departmental statement in the College of Humanities catalog. Placement tests are required for all matriculating (including transfer) students who continue the study of Latin in the University in courses 050, 101, 102, 103, 104, 200, 201, and 202. A placement test will be given on the first day of the quarter. For details see the Departmental secretary in Room 217, Derby Hall.
300* (501) U 3
Roman Historians
W. 3 cl.
Prereq.: 2 courses at 200 level, or permission of instructor.
Selected readings from Sallust and Tacitus.

301* (502) U 3
Lyric, Elegy, and Epigram
A. 3 cl.
Prereq.: 2 courses at 200 level, or permission of instructor.

302* U 3
Satire
Sp. 3 cl.
Prereq.: 2 courses at 200 level, or permission of instructor.
The development of Roman satire with emphasis on Horace and Juvenal.

303 (505) U 3
Grammatical Review
A. 3 cl.
Prereq.: 2 courses at 200 level.

304† U 1
Latin Prose Composition
A. 1 cl.
Prereq.: 2 courses at 200 level.

305† U 1
Latin Prose Composition
W. 1 cl.
Prereq.: 303 and 2 courses at 200 level.

306† U 1
Latin Prose Composition
Sp. 1 cl.
Prereq.: 305.

312 (612) U 3
Intermediate Latin Prose Composition
W. 3 cl.
Prereq.: 4 courses more advanced than 104, one of which must be 303; and at least 2 courses from 304-305-306.

339† U 3
Lucretius: De rerum natura
A. 3 cl.
Prereq.: 2 courses at 200 level, or permission of instructor.

340† (540) U 3
Essays of Cicero
W. 3 cl.
Prereq.: 2 courses at 200 level, or permission of instructor.

344† (544) U 3
Ovid
Sp. 3 cl.
Prereq.: 2 courses at 200 level, or permission of instructor.

603 U G 3
Advanced Reading
Sp. 3 cl.
Prereq.: 4 courses more advanced than 104.
Cleary.

612 U G 3
Advanced Latin Prose Composition
W.
Prereq.: 312 or equiv.
Davis.

615 U G 3
Studies in Cicero
A. 3 cl.
Prereq.: 4 courses more advanced than 104.
especially recommended for prospective secondary school teachers.

616 U G 3
Studies in Vergil
Sp. 3 cl.
Prereq.: 4 courses more advanced than 104.
especially recommended for prospective secondary school teachers.

617 U G 3
Studies in Caesar
W. 3 cl.
Prereq.: 4 courses more advanced than 104.
especially recommended for prospective secondary school teachers.

625 U G 3
Introduction to Medieval Latin
W. 3 cl.
Prereq.: For departmental majors, four courses more advanced than 104; for others, 2 yrs. of secondary school Latin, or Latin 112, and a reading knowledge of a modern Romance Language or Ger.
Extensive reading in texts illustrating the history of Latin language and literature from the fourth through the thirteenth century. Forbes.

693 (631) U G 1-6
Individual Studies in Latin
Prereq.: 4 courses more advanced than 104.
Repeatable to a maximum of 15 cr. hrs.
Passages for reading and topics for investigation will be selected to meet the needs of individual students. Schlam.

694 U G 1-6
Group Studies in Latin
Sp.
Prereq.: 4 courses more advanced than 104 or permission of chairman.
Repeatable to a maximum of 20 cr. hrs.
899†  G 3
Senior Seminar and Tutorial
Sp. 1-2 hr. cl., 1 hr. arr.
Prereq.: Permission of chairman.
Open only to senior majoring in Latin.
Conference course for senior majors with particular emphasis on individual work.

GENERAL PREREQUISITES FOR COURSES
NUMBERED 800 AND ABOVE
Prerequisites for admission to courses numbered 800 and above are graduate standing and permission of the chairman.

800  G 3
Proseminar
A.
Required of all grad. students.
Students may not receive credit for both Latin 800 and Greek 800.
An introduction to the materials and methods of research; the history of classical scholarship; individual assignments in bibliographical problems. Forbes.

802  (702)  G 4
Plautus and Terence
Sp.
Abbott.

803  (703)  G 4
Horace
Su.
Babcock.

804†  (704)  G 4
Tacitus
Sp.
Forbes.

805  (705)  G 4
Seneca
A.
Babcock.

806†  (706)  G 4
Livy
Su.

807†  (707)  G 4
Petronius and Apuleius
Sp.
Schlam.

808†  G 4
Lucretius
A.
Snyder.

809†  G 4
Lyric and Elegiac Poetry
A.

810†  G 4
Sallust
A.
Morford.

811  G 4
Juvenal
W.
Morford.

812†  G 4
Vergilian Studies
Sp.
Cleary.

820  (720)  G 3
Introduction to Historical Latin Grammar
A.
Abbott.

827  (627)  G 3
Vulgar Latin
Sp.
Prereq.: Grad. standing in Latin, or French 812, or equiv. linguistic basis.
Abbott.

850  (650)  G 4
History of Roman Literature
A.
Lectures and assigned reading in literary histories on the development of Roman literature; required and suggested passages for translation in each author studied; weekly reports.

851  (651)  G 4
History of Roman Literature
W.
Continuation of 850.

852  (652)  G 4
History of Roman Literature
Sp.
Continuation of 851.

855†  G 3
Latin Epigraphy
W.
Babcock.

856†  G 3
Topography of Rome
W.
The topography and archaeology of ancient Rome as background to Roman history and literature. Morford.

860  G 3
Palaeography
Su.

861  (800)  G 3
Textual Criticism
Su.
Prereq.: 860.
Seminar in Latin Literature
A. 1 2-hr. cl.
Prereq.: Permission of instructor.
Open only to secondary school teachers.
Repeatable to a maximum of 30 cr. hrs.
Readings and discussions around a chosen subject
designed to enrich the classroom work of secondary
school teachers. Clearly.

Individual Studies in Latin
Repeatable to a maximum of 20 cr. hrs.
Assigned reading and individual research.

Seminar I
W
Repeatable to a maximum of 20 cr. hrs.
Credit in this course will be granted only with the
completion of 996.
The seminar will normally consist of a two-term
sequence (A-W or W-Sp); an intensive study of an
author or genre, e.g., Horace, Lucan, Cicero, or satire.

Seminar II
Sp.
Prereq.: 995.
Repeatable to a maximum of 20 cr. hrs.
Continuation of 995.

Research
Research for thesis or dissertation purposes only.

Law
Office: 112 Law Building, 159 North High Street
Professors Kirby (Dean), Bernstein, Caldwell, Callahan,
Day, Fink, Herman, Kozyris, Laughlin, Lynn, Miller,
Murphy, Nordstrom, Pollock, Raskind, Rutledge,
Schwartz, Shipman, Simmons, Stanger, Walker, and
Wills; Associate Professors Carpenier, Clovis, Kindred,
Rose, Roseann, and Sklar; Assistant Professor Geitner;
Adjunct Professor Glander.

Introduction to the Study of Law
A.
First-year students in the College of Law meet for the
discussion of matters introductory to the study of law.
Rutledge.

Freshman Jury Service
First-year law students are required to serve as jurors
in the cases tried by seniors in the course in Trial
Practice.

Appellate Practice I
A, W, Sp. 3-qtr. sequence; 1 cr. hr. assigned A, and
0 cr. hr. assigned W, and Sp.
S or E grade given on completion of 3-qtr. program.
Procedural and substantive aspects of appellate
practice; the student prepares a brief and presents an
oral argument on the basis of assigned research
materials. Herman and Moot Court Governing
Board.

Contracts
A, W, Sp. 3 cl.; 3-qtr. sequence; credit given on
completion of 9 cr. hrs.
Must enroll to a maximum of 9 cr. hrs.
Remedies for breach: offer and acceptance;
consideration; third party beneficiaries; assignment of
rights and delegation of duties; conditions; impossibility
and frustration; statute of frauds. Clovis, Nordstrom,
and Stanger.

Torts
A. 2 cl., W, Sp. 3 cl.; 3-qtr. sequence; credit given on
completion of 8 cr. hrs.
Must enroll to a maximum of 8 cr. hrs.
Trespass to person and property; conversion; privileges;
negligence; strict liability; nuisance; owners and
occupiers of land; tort and contract; misrepresentation;
defamation; right of privacy. Carpenter, Geitner, and
Miller.

Property I
A, W. 3 cl.; 2-qtr. sequence; credit given on completion
of 6 cr. hrs.
Must enroll to a maximum of 6 cr. hrs.
Incidents of ownership as applied to both real and
personal property; possessory interests; concurrent
interests; marital interests; future interests; contractual
modification of these interests. Callahan and Lynn.

Acquisition and transfer of ownership; adverse
possession; conveyance (deeds, mortgages, and
leases); intestacy; wills; the recording systems; title
registration. Callahan and Lynn.

Civil Procedure
A, W, Sp. 3 cl., 3-qtr. sequence; credit given on
completion of 9 cr. hrs.
Must enroll to a maximum of 9 cr. hrs.
Civil procedure in state and federal courts; development
of equity; abolition of common law forms of action;
merger of law and equity; jurisdiction; venue. Fink,
Walker, and Wills.
510 (550) P 3
Constitutional Law
W, Sp. 3 cr., 2-qtr. sequence; credit given on completion of 6 cr. hrs.
Must enroll to a maximum of 6 cr. hrs.
Functional study of the major substantive, methodological, and federalistic limitations upon governmental power obtaining under practice of judicial review. Laughlin, Rosen, and Schwarz.

511 (570) P 2
Legal Research
Use of law books, both English and American; problems in the use of reports, statutes, selected annotated cases, texts, encyclopedia, digests, dictionaries, periodicals, and citation books. Pollack.

512 P 3
Introduction to Federal Income Taxation
A. 3 cr.
Basic topics in federal income taxation under Internal Revenue Code, Income Tax Regulations, administrative rulings, and cases including research problems, and consideration of tax policies. Raskind and Rose.

600 (093) P 0
Appellate Practice II
W, Sp.
Preparation of a brief and presentation of an oral argument to a panel comprising members of law faculty, bench, and bar. Herman and Moot Court Governing Board.

602 (545) P 4
Legal Process
W. 4 cr.
Comparative evaluation of law-making by private parties, courts, legislatures, and administrative agencies; retroactivity; adherence to precedent; purposes of legislation; statutory interpretation. Pollack.

603 (555) P 3
Evidence
A, W. 3 cr. or W, Sp. 3 cr.; 2-qtr. sequence; credit given on completion of 6 cr. hrs.
Must enroll to a maximum of 6 cr. hrs.
Survey of rules of evidence; particularly demonstrative, testimonial, and circumstantial proof; qualification and examination of witnesses; privilege; relevancy; documents; hearsay rule and its exceptions. Callahan and Rutledge.

604 (565) P 3
Pleading
A, Sp. 3 cr.
Pleading under codes and Federal Rules of Civil Procedure; requirements of pleadings; variance and amendments; defenses; defenses and new matter; counterclaims; reply; demurrer; motions; interrogatories; joinder; Wills.

605 (575) P 3
Negotiable Instruments Law
W. 3 cr.
Types of commercial or negotiable paper; transfer; purchase and payment in due course, discount and security. Clovis, Kindred, and Nordstrom.

606 Federal Income Taxation
Study of federal income tax; concept of taxable gross income; deductions; reporting methods; capital gains and losses; treatment of corporations and shareholders, partnerships, and trusts.

606.01 Federal Income Taxation
A. 4 cr.
Not open to students with credit for 606.02.
Traditional federal income taxation course with class time limited to one quarter. Raskind.

606.02 Federal Income Taxation
W, Sp. 3 cr.; 2-qtr. sequence; credit given on completion of 6 cr. hrs.
Must enroll to the maximum of 6 cr. hrs.
Not open to students with credit for 606.01.
Consideration of the basic material covered in 606.01 with extended coverage in certain areas, including corporate tax problems. Rose.

607† (565) P 1-8
Business Associations
A, W. 4 cr. or W, Sp. 4 cr.; 2-qtr. sequence; credit given on completion of 8 cr. hrs.
Must enroll to a maximum of 8 cr. hrs.
Not open to students with credit for 632.
Forms of business organizations; planning corporate and other relationships for commercial and industrial purposes.

669 (630) P 3
Sales
A. 3 cr.

610 P 3
Sales Financing
Sp. 3 cr.
Prereq.: 609.
Emphasis on the Uniform Commercial Code; financing sale of goods, intangibles, and proceeds; validity of and perfecting security interests; priorities and remedies. Clovis and Nordstrom.

611 (650) P 4
Administration of Criminal Justice
W, Sp. 4 cr.
Processes of criminal justice from arrest to parole and probation; impact upon traditional practices and procedures resulting from major decisions of the Supreme Court of the United States. Herman and Sklar.

612 (652) P 3
Admiralty Law
Su. 3 cr.
Admiralty jurisdiction; injuries to seamen and maritime workers; bills of lading; charter parties; salvage; general average; limitation of liability. Stanger.

613 (610) P 4
Labor Law
A. 4 cr.
Not open to students with credit for 630.
Collective bargaining processes and duty to bargain; grievance arbitration; legal limitation on economic pressures, including interference with bargaining, strikes, picketing, and boycotts. Rutledge.
Comparative Law—Western Europe
W. 3 cl.
Substantive and procedural aspects of legal systems in comparison with American law. Day.

Comparative Law—Latin America
W. 3 cl.

Estate-Gift Taxation
A. Sp. 3 cl.
Federal gift and estate taxation; federal tax practice; interrelationships of death and gift taxes with federal income taxes. Glander and Lynn.

Insurance
A. 3 cl.
Insurance law and practice with particular reference to fire, life, and automobile insurance; insurable interest; warranties and representations; waiver and estoppel; construction standards policies. Callahan.

international Law
A. or A. W. 1 or 2-qt. sequence for the minimum of 3 cr. hrs. and the maximum of 6 cr. hrs. depending on course offering.
Current problems in international law; international agreements; status of states and individuals; recognition; jurisdiction and procedural prerequisites to assertion of international claims. Miller and Stanger.

Jurisprudence
Sp. 3 cl.
Jurisprudential thought as represented by general theories of or about law; assessment of leading juridical doctrines; relationship to social control policy and to legal precepts. Pollack.

Real Property Mortgages
A. 3 cl.
Mortgages and their use as a security device in real property transactions; common mortgage provisions; methods of enforcement of rights; "equitable" mortgages. Carpenter.

State and Local Taxation
W. 3 cl.
Legal problems arising in property, excise, income, and estate-inheritance taxation; tax administration and procedure. Glander.

Federal Antitrust Law

Federal Antitrust Law
Sp. 3 cl.
Not open to students with credit for 623.02.
Condensed and basic coverage of federal antitrust law with class time limited to one quarter. Raskind.

Federal Antitrust Law
A. W. 3 cl., 2-qt. sequence; credit given on completion of 6 cr. hrs.
Must enroll to a maximum of 6 cr. hrs.
Not open to students with credit for 623.01.
Extended coverage of cases, statutes, and materials involving federal antitrust law. Day.

Taxation of Foreign Income
Sp. 3 cl.
Taxation of individuals and business operating in United States and abroad; jurisdiction, income source, foreign tax credit, treaty structure; special statutory entities for foreign trade. Raskind.

Copyright Law
A. 3 cl.
Protection of literary, musical, artistic, and commercial property under common law; the federal copyright statute and related legislation. Raskind.

Law and the United Nations
Sp. 3 cl.
Establishment of the United Nations, conditions of access, and performance of various functions in the decision process by Security Council, General Assembly and International Court. Stanger.

American Legal History
Sp. 3 cl.
Studies in history of American law and exploration of relationship between development of the legal system and rise of an industrial society. Simmons.

Legal Problems of Financial Information
A. 3 cl.
Substantive law problems involving financial information in the basic context of partnership and corporation law and the Internal Revenue Code. Rose.

Legislation
A. 3 cl.
Roles of the lawyer in the legislative process; legislative organization, jurisdiction, and procedure; formation of legislative policy; legislative drafting, statutory interpretation. Caldwell.
630  P 1-5
Labor Law and Practice
A. or A, W. 1-5 cl.; 1 or 2-qtr. sequence; credit given on completion of 5 cr. hrs.
Must enroll to a maximum of 6 cr. hrs.
Not open to students with credit for 613.
Law and practice in labor-management and union-employee relations; self-organization; unfair labor practices; arbitration; emergency disputes; public employment and union internal affairs. Bernstein.

631  P 3
Estate Planning
A. or W, Sp. 3 cl., 2-qtr. sequence; credit given on completion of 6 cr. hrs.
Must enroll to a maximum of 6 cr. hrs.
Creation and characteristics of trust and future interests; class gifts, powers, rules against perpetuities, techniques and restrictions suggested by estate and gift taxes. Carpenter and Lynn.

632  P 3
Corporations
A. or W, or Sp. 3 cl., 2-qtr. sequence; credit given on completion of 6 cr. hrs.
Must enroll to a maximum of 6 cr. hrs.
Not open to students with credit for 607.
Formation, rights and duties of directors, officers, and shareholders; derivative suits; issuance and transfer of securities. Kozyris, Rose, and Schwarz.

633  (520) P 3
Criminal Law
A, W, or W, Sp. 3 cl., 2-qtr. sequence; credit given on completion of 6 cr. hrs.
Must enroll to a maximum of 6 cr. hrs.
Not open to students with credit for 509.
Criminal law as means of attaining socially desirable ends, stressing criminal behavior and handling of those who engage in that behavior. Herman and Sklar.

634  P 3
Family Law I
W. 3 cl.
Problems of the marriage relationship, including marriage, annulment, divorce, custody, intra-family relationships, and relation of family members with others. Kindred.

635  P 3
Family Law II
Sp. 3 cl.
The child: adoption, illegitimacy; the battered child; parental prerogatives and responsibility in medical care, religion, education; school law and student rights; dependent children; juvenile courts. Kindred.

637  P 3
Legal History
Sp. 3 cl.
Comparative studies in history of law and exploration of relationship between development of legal systems and societal structures. Murphy.

638  P 3
Legal Problems in Real Estate Financing
W. 3 cl.
Not open to students with credit for 621.
Mortgages and their use as security devices in real property transactions; emphasis upon various devices for financing real estate acquisitions and developments. Murphy.

639  P 3
Urban Housing
A. 3 cl.
Housing needs of the urban poor considered in the light of the rights, remedies, and resources of the legal system. Simmons.

654  P 1-6
Group Studies
Repeatable to a maximum of 20 cr. hrs.
Group study in selected areas of the law.

701† (653) P 3
Advanced Legal Research
Research techniques providing basic experience in analyzing legal questions, using appropriate publications, and in reaching competent solutions to legal problems. Poliack.

702 (560) P 4
Restitution
Sp. 4 cl.
Restitutionary remedies available for tort, misrepresentation, breach of contract, and for benefits conferred voluntarily, under duress or mistake, or in partial performance of contract. Nordstrom.

703 (600) P 3
Legal Clinic
2-qtr. sequence; credit given on completion of 6 cr. hrs.; enrollment available each quarter.
Must enroll to a maximum of 6 cr. hrs.
Practical experience in handling actual cases under supervision of the director and the faculty of the Legal Clinic. Walker.

704 (605) P 3
Trial Practice
Prerequisites: 603 and 604.
State and federal procedures in civil or criminal causes; individual student practice in the trial of a jury of a civil or criminal case. Geltner, Laughlin, Rutledge, and Sklar.

705 (655) P 3
Bankruptcy
A. 3 cl.
Methods used for the liquidation of debtors' estates, emphasizing first seven chapters of the Bankruptcy Act. Shipman.
Conflict of Laws
W.  4 cl.
Private law pertaining to jural relations containing one or more foreign elements; jurisdiction; foreign judgments; domicile; choice of law; torts; workmen's compensation acts; contracts; property; family law; decedents' estates. Kozyris and Miller.

Administration of Decedents' Estates
W.  3 cl.
Probate and contests of wills; jurisdiction; effect and necessity of administration; inventory and assets; contracts; sales and investments by personal representatives; claims; accounting and distribution. Wills.

Arbitration Law and Practice
Sp.  4 cl.
Commercial and labor arbitration under Ohio and federal arbitration statutes; drafting arbitration clauses; conduct of proceedings; arbitrable issues; court enforcement or impeachment of awards. Bernstein.

Regulation of Security Distributions
A.  3 cl.
Prereq.: 607 or 632.
Analysis of Security Act of 1933 and pervasive effects upon issuance of securities and transfers; study of exemptions and restrictions on transfer and value. Shipman.

Federal Courts
A.  4 cl.
The Federal judicial system; jurisdiction of the district courts, courts of appeals, and United States Supreme Court. Fink.

Local Government Law
W.  3 cl.
Types and organizations of local government units; intergovernmental relations; “home rule” power of Ohio municipalities; personnel; lawmaking; community planning; taxing and finance; contracts; legal liability. Simmons.

Appellate Practice IV
A. Sp.
Procedural and substantive aspects of appellate practice; perfection of appeals, preparation of briefs, and oral argument. Herman.

Receivership and Reorganization
A.  3 cl.
Prereq.: 607 or 632.
Equity receivership and corporate reorganization under Chapter X of the Bankruptcy Act; arrangements under Chapter XI of the Act. Kozyris.

Advanced Federal Income Taxation
W.  3 cl.
Prereq.: 606.01 or 606.02.
Advanced study of federal income taxation dealing with corporations and shareholders; partnerships, trusts and decedents' estates; practice and procedure. Raskind.

International Trade Regulation
Sp.  3 cl.
Prereq.: 623.01 or 623.02.
Extraterritorial application of United States trade regulation law, international treaties, and conventions, and trade regulation in European Common Market. Day.

Unfair Trade Practice
A.  3 cl.
Unfair trade practices of common law and statutes, trademarks, trade names, misappropriation of ideas, false advertising, disparagement, resale price maintenance, and price discrimination. Day.

Natural Resources
Sp.  4 cl.
The nature and incidents of public and private interests in water, minerals, oil and gas; conveyancing of natural resources; and mineral, oil, and gas leasing. Murphy.

Social Legislation
Sp.  4 cl.
Characteristics of statutory devices and their utility in effectuating social policy with emphasis upon acts and bills dealing with employment, but including related private plans and unemployment programs. Bernstein.

Urban Development
Sp.  3 cl.
Not open to students with credit for 725 or 730. The inner city and regional planning through zoning, condemnation, and other legal devices. Fink.

The Federal System
W.  3 cl.
Allocation of authority between federal and state law and courts; Congressional power over the jurisdiction of courts; litigation involving the government or its agents.

Food and Drug Law
A.  3 cl.
Study of the development, administration and application of federal and state laws which regulate the manufacture, advertising, and sale of food, drugs, and cosmetics. Day.
Comparative Criminal Law and Procedure
Sp. 3 cl.
The criminal processes of representative Western European countries and of Japan; underlying assumptions; bases of penal liability; particular crimes and offenses; the inquisitorial process. Sklar.

Land Use Planning I
W. 3 cl.
Not open to students with credit for 721.
Techniques and consequences of limitations imposed upon use of private land by private covenant and public action; nuisance; covenants; zoning, and subdivision controls. Simmons.

Regulated Industries
Sp. 4 cl.
Explanation of legal principles relevant to the rate regulation process and an analysis of other regulatory problems in the television, transportation, and atomic industries. Kozyris and Schwartz.

International Transactions
Sp. 3 cl.
Legal problems of importing from, exporting to, and doing business abroad, particularly in Common Market areas, arising from quotas, exchange controls, and comparable restraints. Kozyris.

Administrative Practice
A. 4 cl.
Introduction to administrative process; reconciliation of the primary features of this process, with traditional political-legal theories of separation of governmental powers. Rutledge.

Land Use Planning II
Sp. 3 cl.
Prereq.: 721 or 725.
Study of public regulatory devices for land use and development; eminent domain; planned unit development; urban renewal; official maps; new towns; open space. Simmons.

Business Planning
A, W. or W, Sp. 2 cl., 2-qt. sequence; credit given on completion of 6 cr. hrs.
Must enroll to a maximum of 6 cr. hrs.
Prereq.: 607 or 632, 605.01 or 605.02; 628 recommended.
Advanced study in corporations and taxation of corporations and shareholders. Shipman.

Conservation Law
W. 3 cl.
Legal problems relating to the living environment; legal problems of conservation of resources such as forest, wild-life, soil, and parks. Murphy.

Political and Civil Rights I
A. 3 cl.
Advanced study of Bill of Rights and 13th, 14th, and 15th Amendments in contemporary social milieu; freedom of speech, association; academic freedom; advocacy and symbolic expression. Laughlin.

Political and Civil Rights II
W. 3 cl.
Advanced study of civil rights and legal problems of race relations in contemporary social milieu; segregation; discrimination; equal protection; separatism. Laughlin.

Law Journal
Prereq.: Selection for Law Journal by Editors and Faculty.
Three cr. hrs. counted toward graduation requirement, but no grade awarded.
Special studies covering diverse subjects of a legal nature participated in by the group selected for work on the Law Journal. Laughlin.

Individual Studies
By special arrangement with the Dean's office, special problems or projects may be taken for credit under the supervision of members of the faculty. The credit granted varies in proportion to the magnitude of the project. In general, assignment of special problems will be limited to instances of exceptional student specialization, scheduling difficulties, and curricular irregularity.

Seminars in Legal Planning
A, W, Sp. 3 cl.
Small-group training in the non-litigious functions of the practicing lawyer. Legal planning involves the resolving of fact situations and policy questions of means and ends, together with the effectuation of determinations made in connection therewith. Effection of policy decisions often involves the skills of negotiation and draftsmanship, as well as the techniques of counseling and litigation. (Training in these latter two techniques is provided by Legal Clinic and Trial Practice, respectively.) Following is a list from which Seminars in Legal Planning are drawn each year:

Business Planning
Planning and drafting in field of business association; principally concerned with problems in general and limited partnerships, business trusts, and closely held corporations.

Estate Planning
Planning an effective and economical gift distribution of property interests; consideration of techniques and restrictions suggested by law of property, wills, future interests, insurance, and taxation.

Federal Tax Planning
Prereq.: 696.
Tax problems in business organizations, corporations, partnerships, and individual estates.
755.04 General Legal Planning
Representative types of personal and business transactions which confront general practitioner, including contracts, partnership agreements, purchase agreements, sales agreements, deeds, wills, and trusts.

755.05 Planning Through Negotiation
Planning negotiations; weighing legal, economic, and social factors and use of techniques for attainment of objectives.

755.06 Legislative Planning
Role of lawyer in advocating or opposing state and federal legislation; problems selected from past and current proposals before legislature.

755.07 Planning Seminar in Law
Repeatable to a maximum of 6 cr. hrs.
Topics will change as specially scheduled in any quarter.

755.08 Legal Administration of Natural Resources
Prereq.: 714 or 732 recommended.
Study of administration techniques for control and conservation of natural resources; consideration of problems of regulation, finance, management, and taxation.

796 (696) P 3
Seminars in Legal Research
A, W, Sp. 3 cr.
Individual training in original research, together with practice in expository legal writing. Subject matters are chosen for their capacity to provide training in the effective integration, with legal factors, of relevant social, economic, and other non-legal materials.
Following is a list from which Seminars in Legal Research are drawn each year.

796.01 Antitrust Law and Economics
Prereq.: 623.
Evaluation of domestic antitrust law on the basis of current economic theories. (Interdepartmental seminar of the Department of Economics and the College of Law.)

796.02 Antitrust Law and International Cartelization
Prereq.: 623.
Application of domestic antitrust policy to foreign operations of American corporations.

796.03 Constitutional Problems
Advanced constitutional questions, involved in evolution of judicial review, intergovernmental relationships, protection of civil liberties, special problems under Ohio Constitution.

796.04 Social Legislation
Federal wage and hour legislation, including: nature of employment relation; Fair Labor Standards Act; exemptions; compensable time; overtime on fluctuating workweek; child labor.

796.05 Legal Problems of Foreign Trade and Investment
Problems encountered by American business enterprises engaged in foreign trade or investment.

796.06 Legal Regulation of Business Practice
Regulation of competitive practices through legislative, administrative, and judicial action; equality of opportunity for small business; the Robinson-Patman Act.

796.07 Legal Regulation of Devolution of Property
Socio-legal problems raised by devolution of wealth through such arrangements as public welfare programs, union welfare funds, insurance, foundations, charitable trusts, and pension trusts.

796.08 Problems in the Law of Evidence
Prereq.: 603.
Advanced evidentiary questions involved in preparation for and trial of cases.

796.09 Problems in Local Government Finance
Taxes by and financing of local governmental units, including power of and procedure for taxing, expending funds, financing improvements or services.

796.10 Problems in Public Contracts
Types of government contracts; governmental authority to make contracts; limitations; advertising; bids and awards; formal requisites; standard clauses; contractors' bonds; performance and termination; liabilities.

796.11 The Functional Approach to Law
Analysis of certain rules and situations to which they relate; evaluation of rules and of assumptions of cause and effect made as to those rules.

796.12 Legal and Economic Problems in State and Local Taxation
Prereq.: 622.
State taxation and intergovernmental tax relations in terms of law and fiscal economics. (Offered in cooperation with the Department of Economics.)

796.13 Medical-Legal Problems
Conflict in concept between disciplines of law and medicine in matters of causation, injury, disability, prognosis, aggravation and re-injury related to their use in proof of such elements in litigation.

796.14 The Individual and His Government
Government powers in democratic and totalitarian countries; relation of power to will of people; justice and fair hearing; personal freedoms surviving legislative and executive encroachments.

796.15 Comparative Labor Law
Prereq.: 613.
Problems in American labor law viewed from the standpoint of both American and foreign law; collective bargaining; the use of economic force; internal and inter-union affairs.

796.16 Right of Privacy
Individual's interests in freedom from publicity and in physical seclusion; particularly legal response to social and technological changes which threaten these interests.

796.17 Regulated Industries
Principal regulatory agencies, both federal and state, with respect to licensing, rate-making, mergers, and general supervision of business practices.

796.18 International Law of Shareable and Strategic Resources
Processes of interaction, claim, and decision with respect to resources largely open to use by all states, including the ocean, "outer" space, air space, international rivers, canals, and polar areas.

796.19 Selected Problems in Criminal Law and Procedure
Purposes and effects of punishment; wiretapping; Uniform Arrest Act; right to counsel; habeas corpus and other postconviction remedies; treatment of criminal cases by mass communications.

796.20 Research Seminar in Law
Repeatable to a maximum of 6 cr. hrs.
Topics will change as specially scheduled in any quarter.

796.21 Legal Controls of the Economy
Study of State and Federal legislation affecting economic activity, including employment acts, antipoverty legislation, tariffs, financing laws, and legal basis of the Federal Reserve System.
796.22 The Legal Implementation of Social Policy
Interdisciplinary research and field work in
institutions protective of children.

796.23 Jurisprudential Approaches to Decision
Making
Considerations of conceptions of the role of law and
lawyers in decision processes, with emphasis upon
clarification of goal values, drawing on contemporary
behavioral and communications sciences, in order to
develop problem-solving tools and procedures.

796.24 Syntactic Analysis and Other Tools in
Statutory Drafting and Interpretation
A study of the role of the legislature in authoritative
law-making with emphasis upon the need for a
contextual approach to problems of interpretation,
and the consideration of modern syntactic analysis
in statutory drafting and interpretation.

796.25 Problems of Administration Law
Prereq: 601 recommended.
An examination in detail of some of the more
troublesome aspects of contemporary executive and
administrative operations at federal and state levels.

796.26 Jury Trial
An examination of the role of juries including jury
selection, standard instructions, special verdicts,
law and fact, myths of jury trial and powers of
juries vis-a-vis powers of administrative bodies.

796.27 International Criminal Law
Jurisdiction of tribunals over individuals committing
acts considered criminal under international law but
not local law; defenses urged; examination of piracy
and war crimes.

796.28 Socio-Economic Environment of Law
An examination of selected aspects of the
socio-economic environment which affect the scope,
content, and effectiveness of legal practice, rules
and institutions.

796.30 Urban Studies
Legal problems confronting inhabitants of major
urban cities; effect on urban redevelopment; legal
rights of services for poor.

796.31 Housing and Urban Development
Operation of and legal problems confronting
governmental agencies concerned with housing and
urban development in local communities.

796.32 Insurance
Organization and regulation of insurance carriers
and marketing arrangements; rate-making;
investment practices; reinsurance; solvency;
rehabilitation and liquidation of companies.

796.33 Jurimetrics
Study of the use of mathematical techniques and
computer systems in legal analysis, legal research,
and judicial administration.

796.34 International Legal Problems of Community
Health
Prereq: 619.
Policy alternatives of United States and/or
international organizations for the solution of
selective health problems, e.g. population explosion,
famine, medical brain drain, and environmental
pollution.

796.35 Law and Economic Development
Study of the relationship between legal institutions
and economic development; comparison of economic
growth of the United States and developing nations.

797 P 1-5
Interdepartmental Seminars
(See under Interdepartmental Seminars.)
a† Professional Responsibilities and the Great Issues
of Our Time; W, Sp.
Repeatable by permission.

798 Planning and Research Seminars
Small-group training in legal and non-legal research,
expository legal writing, and various non-legalistic
functions of the practicing lawyer.
Following is a list from which Seminars are drawn
each year:

798.01 Securities Regulation
2-4 cl.; 1 or 2-qtr. sequence; credit given on
completion of 4 cr. hrs.
Must enroll to a maximum of 4 cr. hrs.
Prereq.: 709.
Study of recent legal developments affecting security
trading market, brokers, exchanges and NASD;
investment companies, and other institutional
investors.

798.02 Trade Regulation
3 cl.; 2-qtr. sequence; credit given on
completion of 6 cr. hrs.
Must enroll to a maximum of 6 cr. hrs.
Prereq.: By designation of instructor.
Study of current problems of trade regulations, e.g.
antitrust, unfair trade practices, patents, food and
drug law.

798.03 Problems in Torts and Other Deprivations
3 cl.; 2-qtr. sequence; credit given on
completion of 6 cr. hrs.
Must enroll to a maximum of 6 cr. hrs.
Study in frontier areas of torts (no-fault
compensation plans) and related areas of remedies
for deprivations of well-being and respect.

Linguistics
Office: 256 Dieter Cunz Hall of Languages, 1841 Millikin Road
Professors Lehnste (Chairman) and Fillmore; Associate
Professors Callaghan and Zwicky; Assistant Professors
Drachman, Landon, and Stampe.
See also the course listings in English, the foreign
languages, Romance Linguistics.

201 U 5
Introduction to Language
A, W, Sp. 5 cl.
H201 (honors) may be available to students enrolled
in a college honors program or by permission of dept.
A general survey of language and languages, and the
ways available to study them, with English as the
locale language.
211 U 5
Elementary Swahili
A. 5 cl., 3 lab. hrs.
An introduction to Swahili, with emphasis on phonology and morphology; acquisition of basic sentence patterns.

212 U 5
Elementary Swahili
W. 5 cl., 3 lab. hrs.
Prereq.: 211.
Continuation of 211, with emphasis on syntax.

213 U 5
Intermediate Swahili
Sp. 5 cl.
Prereq.: 212.
Oral and written practice; grammar review; reading of selected texts.

214 U 5
Intermediate Swahili
A. 5 cl.
Prereq.: 213.
Continuation of Swahili grammar; reading of contemporary literary texts; excerpts from newspapers and periodicals and other samples of expository prose.

221 U 5
Elementary Hindi
A. 5 cl., 3 lab. hrs.
Sound and writing systems, morphological patterns, basic sentences with brief dialogues and texts.

222 U 5
Elementary Hindi
W. 5 cl., 3 lab. hrs.
Prereq.: 221.
Continuation of 221; reading of simple materials.

223 U 5
Intermediate Hindi
Sp. 5 cl.
Prereq.: 221 and 222.
Oral and written practice; reading of contemporary prose and poetry.

600 U G 3
Phonetics
A. 5 cl.
Prereq.: 601, concur, registration in 601, or an equiv. course in linguistics or phonetics.
Principles of articulatory phonetics; practice in the production, recognition, and transcription of sounds occurring in various languages of the world. Drachman.

601 U G 5
Introduction to Linguistics
Su, A, W. Sp. 5 cl.
A broad introduction to the categories and techniques of general linguistics; phonemic, morphemic, and syntactic analysis; applied, historical, and comparative linguistics.

602 U G 4
Introduction to Syntax
W, Sp. 3 cl., 2 lab. hrs.
602.02 must be completed the quarter following completion of 602.01.
Theories of Syntax; principles of syntactic description.
602.01 Introduction to Syntax I
W.
Prereq.: 601.
602.02 Introduction to Syntax II
Sp.
Prereq.: 602.01.

603 U G 4
Introduction to Phonology
W, Sp. 3 cl., 2 lab. hrs.
603.02 must be completed in the quarter following completion of 603.01.
Introduction to phonological analysis and the principles governing the structure, acquisition, and change of phonological systems; survey of major phonological theories.
603.01 Introduction to Phonology I
W.
Prereq.: 601.
603.02 Introduction to Phonology II
Sp.
Prereq.: 603.01.

609 U G 3
Morphology
A. 3 cl.
Prereq. or concur.: 601, or permission of instructor.
A structural approach to grammatical analysis. Callaghan.

611 U G 5
Introduction to Historical Linguistics
Sp.
Prereq.: 601.
Introduction to the methods and principles of historical linguistics. Lehiste.

621* U G 5
Elementary Sanskrit
A.
Prereq.: 601 and permission of instructor.
Introduction to Indo-European, Indic, and Sanskrit; reading of introductory texts.

622* U G 5
Classical Sanskrit
W.
Prereq.: 621 or permission of instructor.
Reading of classical Sanskrit texts.

623* U G 5
Vedic
Sp.
Prereq.: 622 or permission of instructor.
Introduction to Vedic.
624* U G 5
Advanced Sanskrit
A.
Prereq.: 623 or permission of instructor.
Reading of advanced Sanskrit texts.

625* U G 5
Readings in Indic Linguistics
W.
Prereq.: 624 or permission of instructor.
Reading and interpretation of Indic texts dealing with
linguistics, especially the grammar of Panini.

626++ U G 5
Indo-Aryan Studies
Sp.
Prereq.: 625 or permission of instructor.
Survey of Indo-Aryan linguistics; introduction to an
Aryan language other than Sanskrit or history of a
Sanskrit-related branch of Indic.

650 U G 5
Field Methods in Linguistics
Sp. 4 cl.
Prereq.: 601.
Techniques for describing languages by the use of
native informants. Callaghan.

671 U G 5
Psycholinguistics
Sp. 4 cl.
Prereq.: 603.02.
The contribution of linguistic theory to the study of
the acquisition, maturation, and functioning of
language skills. Drachman.

672 U G 3-5
Languages of the World
A, W, Sp. 3-5 cl.
Prereq.: 601.
Repeatable to a maximum of 30 cr. hrs.
Under direction of the linguistics staff, informant and
laboratory techniques will be employed to teach a
selected language not otherwise offered at the
University.

673 U G 5
History of Linguistics
A. 5 cl.
Prereq.: 601.
Ancient, Medieval, Renaissance, and Enlightenment
views on language; origins of historical and
comparative linguistics; development of 20th century
schools of linguistic theory. Stampe.

679 U G 5
The Classification of Linguistic Structures
W. 5 cl.
Prereq.: 601.
An examination of the schemes for classifying linguistic
structures, phenotypic (typological) and genotypic
(genetic or genealogical), and some of the content of
each type. Landon.

681 U G 5
Algebraic Linguistics
W. 5 cl.
Prereq.: 601 and permission of instructor.
Formal properties of grammar and automata; relations
between linear, context-free and context-sensitive
grammars and finite, pushdown-storage and
linear-bounded automata; properties of
transformational grammars. Reeker.

685 U G 5
Contrastive Structures
W. 5 cl.
Prereq.: 601.
An examination of the notion of linguistic structure
and of methods for quantifying differences between
particular linguistic structures. Landon.

693 (701) U G 1-5
Individual Studies in Linguistics

694 U G 1-5
Group Studies in Linguistics
Prereq.: 601.
Repeatable to a maximum of 30 cr. hrs.
Study of topics not regularly scheduled for seminars
in linguistics, under the direction of a staff member.

695 U G 5
Seminar in Anthropological Linguistics
A.
Prereq.: Anthro. 575 or permission of instructor.
Repeatable to a maximum of 20 cr. hrs.
Callaghan.

795 (720) U G 3-5
Seminar in Linguistics
A, W, Sp. 3-5 cl.
Prereq.: 602 and 603 or permission of instructor.
Repeatable to a maximum of 20 cr. hrs.
Topics include the history of linguistics, grammatical
theory, mathematical models in linguistics, history or
structure of individual languages.

801 (761) G 5
Historical Linguistics I
W. 5 cl.
Prereq.: 601.
An introduction to the methods, conventions, and
literature of comparative-historical linguistics with
primary attention to the comparisons and
reconstructions of phonological systems.

802 (762) G 5
Historical Linguistics II
Sp. 5 cl.
Prereq.: 801.
Advanced work in the comparison and reconstruction
of morphological, phonological, and syntactic systems;
detailed examination of some of the results of past
and current scholarship.
Mathematics

Office: 150 Mathematics Building, 231 West 18th Avenue


101 [412] U 5
Basic Mathematics
Su, A, Sp. 5 cl.
Prerequisites: Placement on basis of OSU Math. test. Programmed instruction used to improve algebraic computation; lectures contain selected advanced topics.

105 [410] U 5
Principles of Mathematics
Su, W, Sp. 5 cl.
Prerequisites: Elem. Educ. standing and Math. 101 or satisfactory score on OSU Math. Test. Development of basic ideas on arithmetic, algebra, and geometry through a study of the structure of selected mathematical systems.

108 U 5
Introduction to Mathematics I
A. 5 cl.
Prerequisites: Open to freshmen who qualify for Level I in English Placement, but who do not qualify for Math. 151 or higher on the basis of OSU Math. test. Exceptions may be made by special permission of the Department of Mathematics. Introduction to basic ideas of mathematics for students in humanities, life, and social sciences.

109 [413] U 5
Introduction to Mathematics II
W. 5 cl.
Prerequisites: 108.

110 [414] U 5
Introduction to Mathematics III
Sp. 5 cl.
Prerequisites: 109.

116 [416] U 5
Mathematics for the Behavioral, Economic, and Social Sciences I
Su, A, W, Sp. 5 cl.
Prerequisites: 101 or satisfactory score on OSU Math. test. Not open for credit for students having credit for 121 or 150 or Math. courses having these as prerequisites. The sequence 116, 117 treats topics in mathematics with applications to the non-physical sciences. Topics will include analytic geometry, calculus, linear algebra, linear programming, and graph theory; applications.
117 (417) U 5
Mathematics for the Behavioral, Economic, and Social Sciences II
Su, A, W, Sp. 5 cl.
Prereq.: 116.
A continuation of 116.

118 U 3
Mathematics for the Behavioral, Economic, and Social Sciences III
Sp. 3 cl.
Prereq.: 117 and permission of instructor.
Continuation of 117; partial derivatives, multiple integrals, series, and applications.

121 U 5
Mathematics for the Business, Social, and Biological Sciences I
Su, A, W, Sp. 5 cl.
Prereq.: Satisfactory score on OSU Placement Test or at least a C in Math. 101.
Not open for credit for students having credit for 116 or 150 or Math. courses having these as prereqs.
The sequence 121, 122, 123 is designed to introduce the student to calculus, probability, and statistics.

122 U 5
Mathematics for the Business, Social, and Biological Sciences II
Su, A, W, Sp. 5 cl.
Prereq.: 121.
Continuation of 121.

123 U 5
Mathematics for the Business, Social, and Biological Sciences III
A, W, Sp. 5 cl.
Prereq.: 122.
Continuation of 122.

150 (439) U 5
Algebra and Trigonometry
Su, A, W, Sp. 5 cl.
Prereq.: 101 or satisfactory score on OSU Math. test.
Not open for credit for students having credit for 116 or 121 or Math. courses having these as prereqs.
Inequalities, functions, graphs, exponential, logarithmic and trigonometric functions and their graphs, complex numbers, inverse functions.

151 (440) U 5
Calculus and Analytic Geometry
Su, A, W, Sp. 5 cl.
H151 (honors) may be available to students enrolled in a college honors program; others with permission
of dept.
Prereq.: 150 or Level I Placement on OSU Math. test.
Not open to students with credit for 418.
Lines, slopes, derivatives, limits, differentiation, rules, mean-value theorem, applications of derivatives to:
curve sketching, maxima and minima, linear motion, related rates, approximations, conics.

152 (441) U 5
Calculus and Analytic Geometry
Su, A, W, Sp. 5 cl.
H152 (honors) may be available to students enrolled in a college honors program; others with permission
of dept.
Prereq.: 151.
Not open to students with credit for 536.
Continuation of 151. Approximating areas, the integral, integration, formulas, applications of integration,
inverse functions, logarithmic and exponential functions, hyperbolic functions, and integration
techniques.

153 (542) U 5
Calculus and Analytic Geometry
Su, A, W, Sp. 5 cl.
Prereq.: 152.
Continuation of 152. Polar coordinates, rotation of axes, vectors, velocity, acceleration, space vectors and
three dimensional analytic geometry, cylindrical, and spherical coordinates; linear systems, matrices, and
characteristic values.

183 U 5
Calculus
Sp.
H163 (honors) may be available to students enrolled in a college honors program; others with permission
of dept.
Prereq.: 152 and permission of dept.
163, 264, 265, substitute for 153, 254, 550 and 551.
A rigorous treatment of vector spaces and limits, continuity and differentiability of multivariable
functions.

H190 U 5
Elementary Analysis I
A. 5 cl.
Prereq.: Permission of dept.
This sequence substitutes for Math. 151, 152, 153, and 155.
Special course sequence for superior students.

H191 U 5
Elementary Analysis II
W. 5 cl.
Prereq.: Permission of dept.
Continuation of 190.

H192 U 5
Elementary Analysis III
Sp. 5 cl.
Prereq.: Permission of dept.
Continuation of 191.

205 (545) U 5
Applications of Mathematics
W, Sp. 5 cl.
Prereq.: Ed. standing and 152 or Statistics 421.
Approximately half of the course will be devoted to a study of probability and statistics; other topics will
be chosen to illustrate applications of mathematics.
221 U 5 Mathematics for the Business, Social, and Biological Sciences IV
A. Prereq.: 123.
Continuation of 123.

254 (543) U 5 Calculus and Analytic Geometry
Su, A, W, Sp. 5 cl.
Prereq.: 153.
Continuation of 153. Partial derivatives, multiple integrals, infinite series.

255 (544) U 5 Differential Equations and Their Applications
Su, A, W, Sp. 5 cl.
Prereq.: (538) or 254.
Not open to students with credit for (608) or 556.
Ordinary differential equations with particular emphasis on linear differential equations, systems of differential equations, applications to electrical, mechanical, and chemical systems.

264 U 5 Calculus
A.
H264 (honors) may be available to students enrolled in a college honors program; others with permission of dept.
Prereq.: 163.
A rigorous treatment of differentials, Jacobians, line integrals, multiple integrals, and Fubini's theorem.

285 U 5 Calculus
W.
H285 (honors) may be available to students enrolled in a college honors program; others with permission of dept.
Prereq.: 264.
Stokes' theorem, Green's theorem, changes of variables, implicit and inverse function theorems.

290 U 5 Linear Algebra
A, Sp. 5 cl.
Prereq.: 152.

291 U 5 Functions of Several Variables I
W. 5 cl.
Prereq.: 290 and permission of dept.
Topology of n-space; convexity, differentiation, maxima and minima, inverse and implicit function theorems.

292 U 5 Functions of Several Variables II
Sp. 5 cl.
Prereq.: 291 and permission of dept.
Lebesque integral; manifolds and forms in n-space; integration on manifolds; stokes and divergence theorem.

294 U 2-5 Special Topics in Mathematics
Prereq.: Permission of instructor.
Repeatable to a maximum of 10 cr. hrs.
Designed to give groups of able students an opportunity to pursue special studies not otherwise offered.

415 U 5 Ordinary and Partial Differential Equations
W, Sp. 5 cl.
Prereq.: 254.
Ordinary, partial, linear, and non-linear differential equations, fourier series, boundary value problems, eigen-value theory, and Bessel functions.

416 U 4 Vector Analysis and Complex Variables
A, Sp. 4 cl.
Prereq.: 264.
Vector algebra and vector operators, line integrals, analytic functions, complex integral theorems, power series, residues, and conformal mapping.

501 (635) U G 4 Fundamentals of Mathematics I
A. 4 cl.
Prereq.: Permission of instructor.
Not open for graduate credit to majors in Math.
Emphasis on fundamentals of mathematics and designed for advanced students from areas not requiring intensive mathematical training. Topics include algebra, the number system, induction, theory of equations, progressions, combinations, and permutations, probability, determinants and matrices, inequalities, analytic geometry, differential and integral calculus.

502 (636) U G 4 Fundamentals of Mathematics II
W. 4 cl.
Prereq.: 501.
A continuation of 501.

503 (637) U G 4 Fundamentals of Mathematics III
Sp. 4 cl.
Prereq.: 502.
A continuation of 502.

504 (631) U G 5 History of Mathematics
A, W. 5 cl.
Prereq.: Ed. standing and 152 or permission of instructor.
Development of mathematics from primitive origins to present form; topics include: development of arithmetic, algebra, geometry, trigonometry, and calculus.
505 (651) U G 5
Fundamental Ideas in Mathematics I
A, W, 5 cl.
Prereq.: Ed. standing and 152 or permission of instructor.
Basic ideas concerning: number systems, sets, fields, axiom systems, finite geometries, projective geometry.

506 (652) U G 5
Fundamental Ideas in Mathematics II
W, Sp. 5 cl.
Prereq.: 505.
Continuation of 505.

507 U G 5
Advanced Geometry I
A, W, 5 cl.
Prereq.: (536), (541), or 152.
Advanced topics from Euclidean Geometry.

512 (609) U G 3
Fourier Series and Boundary Values
Problems for Engineers
A, W, 3 cl.
Prereq.: (508), 255, or 556.
Not open to students with credit for 412 or 557.
Fourier series, applications of Fourier series to the solution of boundary value problems involving partial differential equations, Bessel functions.

513 (622) U G 3
Vector Analysis for Engineers
A, W, 3 cl.
Prereq.: (608), 255, or 556.
Not open to students with credit for 413 or 551.
Vector algebra, vector operators, line integrals, vector integral theorems, curvilinear coordinates; applications.

514 (624) U G 3
Complex Variables for Engineers
W, Sp. 3 cl.
Prereq.: 513 or prereq. or concur. Elec. E. 518.
Not open to students with credit for 414.
Introduction to complex variables, analytic functions, complex integral theorems, power series, residues, conformal mapping.

545 (665) U G 5
Mathematical Logic I
W, 5 cl.
Prereq.: (537), 153, or permission of instructor.
A first course in the study of formal logical systems and their applications to the foundations of mathematics; topics include: definition of mathematical proof; number theory, set theory, and analysis formalized within the predicate calculus; theorems of Godel and Church; recursive function theory and idealized digital computers.

546 (666) U G 5
Mathematical Logic II
Sp. 5 cl.
Prereq.: 545.
A continuation of 545.

550 (601) U G 5
Advanced Calculus I
Su, A, W, Sp. 5 cl.
Prereq.: (390), 254, or permission of chairman.
A rigorous presentation of limits, derivatives, mean value theorems, definite integrals, sequences, and series.

551 (661) U G 5
Advanced Calculus II
Su, A, W, Sp. 5 cl.
Prereq.: 550.
Not open to students with credit for 513.
A continuation of 550 for functions of several variables and vector analysis.

552 (607) U G 5
Introduction to the Theory of Functions
of a Complex Variable I
Su, W, 5 cl.
H552 (honors) may be available to students enrolled in a college honors program; others with permission of dept.
Prereq.: 550.
Not open to students with credit for 414.
Topics discussed include power series expansions, the formula of Cauchy, residues, conformal mappings, and elementary functions in the complex domain.

553 U G 5
Introduction to the Theory of Functions
of a Complex Variable, II
Sp. 5 cl.
Prereq.: 552.
A continuation of 552.

556 (611) U G 5
Differential Equations
A, Sp. 5 cl.
H556 (honors) may be available to students enrolled in a college honors program; others with permission of dept.
Prereq.: (538), 254, or permission of chairman.
Not open to students with credit for 255 or (608).
Equations of first and second orders, linear equations, series solutions, approximate solutions, systems of ordinary equations; Legendre and Bessel equations.

557 (626) U G 5
Fourier Series and Boundary Value Problems
Sp. 5 cl.
Prereq.: (608), 556, or 255.
Not open to students with credit for 412, 542, or 562.
Expansion of function in Fourier series and in series of Legendre polynomials or Bessel functions; solution of boundary value problems from physics.

560 (643) U G 5
Topology
Sp. 5 cl.
Prereq.: 254 or permission of chairman.
Sets and functions, metric spaces, completeness, Baire's Theorem, continuous mappings, Euclidean spaces, compactness, connectedness, topological spaces.
570 (641) U G 5
Elementary Modern Algebra
W, Sp. 5 cl.
Prereq.: 571 and 573.
An introduction to abstract algebra with topics from
elementary ring, field, and group theories; special
emphasis on ring of integers, congruences, polynomial
domains, permutation groups.

571 (670) U G 5
Introduction to Linear Algebra
Su, W, Sp. 5 cl.
H571 (honors) may be available to students enrolled
in a college honors program; others with permission of
department.
Prereq.: (537), 153, or permission of chairman.
Vector spaces, linear maps, matrices, inner product
spaces, systems of equations, determinants, and
spectral theory.

573 (680) U G 5
Elementary Number Theory
A, W. 5 cl.
Prereq.: (537), 153, or permission of chairman.
Utilization of concrete examples to introduce concepts
of modern algebra; prime numbers, congruences,
Diophantine equations, elementary combinatorial
analysis.

574 U G 5
Geometry
Sp. 5 cl.
Prereq.: 570 and 571.
Euclidean and non-Euclidean geometry, emphasizing
algebraic connections; affine and projective planes,
duality. Topics from: geometry of groups, finite planes,
Hilbert's postulates, multidimensional spaces, continuous
geometry.

590 U G 5
Algebraic Structures I
A.
Prereq.: 290.
The sequence 590, 591, substitutes for 570, 573. Integers,
congruence relations, structure preserving maps,
topics from groups, rings, modules, vector spaces,
fields.

591 U G 5
Algebraic Structures II
W.
Prereq.: 590.
Continuation of 590.

593 U G 2-5
Individual Studies in Mathematics
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

594 U G 2-5
Group Studies in Mathematics
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

601 (723) U G 5
Mathematical Methods in Science I
A. 5 cl.
Prereq.: 15 cr. hrs. of Math. at the 400-500 level or
permission of instructor. The recommended
preliminary courses are 590, 561, 562.
Theory of determinants and matrices, real quadratic
and Hermitean forms, groups and vector spaces,
applications to physics and engineering.

602 (721) U G 5
Mathematical Methods in Science II
W. 5 cl.
Prereq.: 601.
Linear differential equations, solutions about singular
points; Fourier series; Sturm-Liouville problems; Bessel
functions and Legendre polynomials; boundary value
problems associated with Laplace's equation.

603 (730) U G 3
Stability Problems in Differential Equations
Sp. 3 cl.
Prereq.: (608), 255, or 556.
Existence and uniqueness of solutions; initial
conditions; periodic solutions; Krylov-Bogoljuboff
method; graphical and numerical methods; applications
to vibrational problems, relaxation theory, and
nonlinear mechanics.

608 U G 5
Advanced Geometry II
Sp. 5 cl.
Prereq.: 507 and permission of instructor.
Continuation of 507; selected topics.

611 (642) U G 5
Principles of Mathematics
for Science and Mathematics Teachers
Su. 5 cl.
Prereq.: Permission of instructor.
(NSF students only).
Introduction to modern mathematics, sets, functions,
topology.

612 (645) U G 5
Modern Geometry for High School Teachers
Su. 5 cl.
(NSF students only).
Coordinate geometry use of vectors in geometry,
matrices and coordinate transformations, matrix
vector operations, characteristic values, diagonalization
of quadratic forms.

613 (646) U G 5
Modern Algebra for High School Teachers
Su. 5 cl.
(NSF students only).
A basic modern algebra course for teachers of algebra;
topics will include: groups, rings, integral domains,
fields, an axiomatic approach to high school algebra.
Analysis for High School Teachers
Su. 5 cl.
(NSF students only).
Extension of the rational number concept to the real number concept, functions, limit concept, sequences, continuous functions, derivative, integral series, applications of the calculus.

Introduction to Real Analysis I
A. 5 cl.
H651 (honors) may be available to students enrolled in a college honors program; others with permission of dept.
Prereq.: Permission of instructor.
Real numbers, infinite sequences and series.

Introduction to Real Analysis II
W. 5 cl.
H652 (honors) may be available to students enrolled in a college honors program; others with permission of dept.
Prereq.: H651.
Classes of functions, Riemann-Stieltjes integral.

Introduction to Real Analysis III
Sp. 5 cl.
H653 (honors) may be available to students enrolled in a college honors program; others with permission of dept.
Prereq.: H652.
Measurable sets and functions, elementary theory of the Lebesgue integral.

Complex Variables
A. 3 cl.
Prereq.: 254 or permission of instructor.
Complex arithmetic, geometry, conformal mapping, analytic functions, and residues.

Elementary Topology I
A.
Prereq.: Permission of dept.
Topics include topological spaces, continuity, separation axioms, product spaces, subspaces, convergence, and homotopy theory.

Elementary Topology II
W.
Prereq.: H655.
Continuation of H655.

Calculus of Variations
A. 5 cl.
Prereq.: 255 or 556; 551.
Variation of a functional: Euler-Lagrange equations; Hamilton-Jacobi theory; second variation Theory of field; Noether theorem; direct methods; applications to geometry and physics.

Algebra I
A. 5 cl.
H670 (honors) may be available to students enrolled in a college honors program; others with permission of dept.
Prereq.: Permission of instructor.
Elementary number theory, polynomials, Euclidean domains; elementary theory of groups and fields, vector spaces and modules over a ring, linear transformations, determinants, normal form of matrices, quadratic forms.

Algebra II
W. 5 cl.
H671 (honors) may be available to students enrolled in a college honors program; others with permission of dept.
Prereq.: H670.
Continuation of H670.

Algebra III
Sp. 5 cl.
H672 (honors) may be available to students enrolled in a college honors program; others with permission of dept.
Prereq.: H671.
Continuation of H671.

Topics in Combinatorial Mathematics
A. 5 cl.
Prereq.: H672 or permission of instructor.
Permutations, combinations, partitions, Latin squares, finite geometries.

Projective Geometry
Su. 5 cl.
Prereq.: H672.
The combinatorial and algebraic aspects of projective geometry, including non-Desarguesian and finite projective planes, coordinations, the theory of collineations, incidence matrices, Latin squares.

Individual Studies in Mathematics
Individual conferences, assigned readings, and reports on minor investigations.

Group Studies in Mathematics
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.
Designed to give groups of students an opportunity to pursue special studies not otherwise offered.
Mathematical Methods in Science III
Sp. 5 cl.
Prereq.: 571, 601, or permission of instructor.
Introduction to tensor analysis with applications to
geometry; elements of the calculus of variations with
applications to physical problems.

Integral Equations and Eigenvalue Problems I
A. 3 cl.
Prereq.: 601 and 602.
Orthogonal functions, linear, integral equations of
first and second kinds, relations to ordinary
differential equations, Volterra's equation, boundary
value problems, practical methods of solution.

Integral Equations and Eigenvalue Problems II
W. 3 cl.
Prereq.: 702.
Distribution of eigenvalues, self-adjointness,
definiteness, Green's functions, minimal properties,
approximation of eigenvalues, eigenfunction
expansions, Ritz method, iteration method, matrix
eigenvalue problems, finite differences.

Operational Calculus
Sp. 3 cl.
Prereq.: 601 and 602.
Laplace transformation in real domain, applications in
physics and engineering; differential equations; Laplace
transformation in complex domain, application to
partial differential equations; Fourier transform,
applications.

Special Functions
W. 3 cl.
Prereq.: 601 and 602.
Power series developments, asymptotic expansion,
gamma functions, cylindrical functions, spherical
harmonics, orthogonal polynomials, hypergeometric
functions, theta functions, elliptic functions and
integrals, numerical techniques.

Applied Complex Analysis
Sp. 5 cl.
Prereq.: 434, or 552 and 556. Students are urged to
fulfill the prereq. with 552.
Basic facts of complex analysis; conformal mapping
properties of elementary functions, Schwartz—
Christoffel formula; distortion theorems; uniformization;
applications to electromagnetic fields, fluid dynamics,
heat flow.

Theory of Probability
A. 3 cl.
Prereq.: 553.
General probability distributions, Stieltjes integral,
characteristic functions, limit theorems.

Mathematical Foundations of the Design
and Use of Automatic Systems I
A. 3 cl.
Prereq.: Grad. standing or permission of instructor.
Boolean operations; reduction of systems of Boolean
functions; Turing machines and general recursive
functions; application to problems relating to design
and use of automatic systems.

Mathematical Foundations of the Design
and Use of Automatic Systems II
W. 3 cl.
Prereq.: 741 and grad. standing or permission of
instructor.
Continuation of 741.

Mathematical Foundations of the Design
and Use of Automatic Systems III
Sp. 3 cl.
Prereq.: 742 and grad. standing or permission of
instructor.
Continuation of 742.

Advanced Mathematical Logic I
A. 5 cl.
Prereq.: 545 or 670.
A study of the axiomatic method; the classical
theorems of Skolem and Gödel; some modern results
about model classes and the theory of definability;
axiomatic number-theory and set-theory.

Real Analysis I
Su, A. 5 cl.
Prereq.: 653.
Relative extremes in partial orders; additive and
countable additive set functions; extensions of set
functions; integration differentiation, applications.

Real Analysis II
W. 5 cl.
Prereq.: 750.
Continuation of 750.

Real Analysis III
Sp. 5 cl.
Prereq.: 751.
Continuation of 751.

Introduction to Complex Analysis I
A. 5 cl.
Prereq.: 653.
Families of holomorphic and meromorphic functions,
geometrical methods of the theory of functions,
conformal transformations; including the Cauchy
integral theorems, Runge's theorem, Riemann mapping
theorem.
754 (802) U G 5
Introduction to Complex Analysis II
W. 5 cl.
Prereq.: 753.
Analytic continuation, general analytic functions, algebraic, entire, elliptic, the gamma and zeta function, Dirichlet's series, Picard's theorems, Mittag-Leffler's theorem, Stirling's formula.

755 (741) U G 5
Introduction to Point Set Topology I
A. 5 cl.
Prereq.: 653.
Topographical spaces, convergence; metric, complete, compact, connected, uniform, and function spaces.

756 (742) U G 5
Introduction to Point Set Topology II
W. 5 cl.
Prereq.: 755.
Continuation of 755.

760* U G 3
Ordinary Differential Equations I
A. 3 cl.
Prereq.: 571 and 653.
Introduction to theory of linear and non-linear ordinary differential equations; equations with singular points; stability theory, boundary value problems.

761* U G 3
Ordinary Differential Equations II
W. 3 cl.
Prereq.: 760.
Continuation of 760.

762* U G 3
Ordinary Differential Equations III
Sp. 3 cl.
Prereq.: 761.
Continuation of 761.

763** (807) U G 3
Partial Differential Equations and Their Applications I
A. 3 cl.
Prereq.: 653.
First order partial differential equations, theory of characteristics; second order partial differential equations; elliptic, parabolic, hyperbolic equations; standard method of solution, Green's function; integral equations.

764* (808) U G 3
Partial Differential Equations and Their Applications II
W. 3 cl.
Prereq.: 763.
Continuation of 763.

767 (704) U G 5
Introduction to the Theory of Approximation I
A. 5 cl.
Prereq.: 653.
Approximation by polynomials and trigonometric polynomials, Chebyshev's theory of best approximation and its generalizations; interpolation processes and mechanical quadrature; orthogonal polynomials and elements of harmonic analysis.

768 (705) U G 5
Introduction to the Theory of Approximation II
W. 5 cl.
Prereq.: 550 and 767.
A continuation of 767.

770† (761) U G 5
Higher Algebra I
Su. A. 5 cl.
Prereq.: 672.
Fields, extensions, normal extension, algebraic closure, Galois group of a polynomial, theory of equations, topics in ideal and valuation theory, rings with minimum conditions crossed products.

771† (762) U G 5
Higher Algebra II
W. 5 cl.
Prereq.: 770.
A continuation of 770.

772† (763) U G 5
Higher Algebra III
Sp. 5 cl.
Prereq.: 771.
A continuation of 771.

775 U G 5
Combinatorial Analysis and Graph Theory I
A.
Prereq.: 672.
Ramsey's theorem, systems of distinct representatives, zero-one matrices, orthogonal Latin squares, combinatorial designs, and difference sets.

776 U G 5
Combinatorial Analysis and Graph Theory II
W.
Prereq.: 775.
Mobius inversion principle, Polya theory of counting, planar graphs, connectivity, coloring min cut max flow, integer programming and combinatorial extrema, graphs and adjacency matrices.

777 U G 5
Combinatorial Analysis and Graph Theory III
Sp.
Prereq.: 776.
Totally unimodular matrices, matroids, combinatorial problems of coding theory, probabilistic fluctuation theory, and other selected topics.
779  U G 2-5
Experimental Number Theory
A. W. Rn.  3 cl., 2 labs.
Prereq.: Permission of instructor.
Topics from elementary and/or algebraic number theory; number theoretical explorations utilizing
high-speed digital computers.

780  U G 5
Number Theory I
A. 3 lec., 2 seminars.
Prereq.: 672.
Diophantine equations, Congruences, p-adic numbers,
algebraic number theory, class numbers, distribution of
primes, continued fractions.

781  U G 5
Number Theory II
W. 3 lec., 2 seminars.
Prereq.: 780.
Continuation of 780.

782  U G 5
Number Theory III
Sp. 3 lec., 2 seminars.
Prereq.: 781.
Continuation of 781.

784  (798)  U G 2-5
Group Studies in Mathematics
Su, A., W., Ws.
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.
When students' need is sufficient, the Department will
offer under this number a course on some phase of
mathematics not covered in its regular offerings.

830  (855)  G 3
Advanced Probability I
A. 3 cl.
Prereq.: 751 and permission of instructor.
Selected topics from foundations, martingales,
stochastic processes.

831  (856)  G 3
Advanced Probability II
W. 3 cl.
Prereq.: 830.
Continuation of 830.

832  (857)  G 3
Advanced Probability III
Sp. 3 cl.
Prereq.: 831.
Continuation of 831.

844  G 5
Advanced Mathematical Logic II
W. 5 cl.
Prereq.: 749.
Continuation of 749.

846  G 2-5
Topics in Discrete Mathematics
W. 2-5 cl.
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

847†  (830)  G 5
Transfinite Arithmetic I
A.
Prereq.: 750 and 770.
Axiomatic Set Theory; ordinal numbers and Transfinite
functions; polynomial representation; normal forms;
number classes; inequalities for cardinal numbers;
consequences of the continuum hypothesis; inaccessible
numbers.

848†  (831)  G 5
Transfinite Arithmetic II
W.
Prereq.: 847.
Continuation of 847.

851  G 3
Differential Geometry I
A. 3 cl.
Prereq.: 751, 756, and 771.
Curves, surfaces, fundamental forms, tensors, and
connections.

852  (842)  G 3
Differential Geometry II
W. 3 cl.
Prereq.: 851.
Continuation of 851.

854  G 5
Differentiable Manifolds and Lie Groups I
W. 5 cl.
Prereq.: 751, 756, and 771.
Tensors, exterior differential forms, connections; Lie
Groups.

855  G 5
Differentiable Manifolds and Lie Groups II
Sp. 5 cl.
Prereq.: 854.
Continuation of 854.

857  (750)  G 3
Introduction to Functional Analysis I
A. 3 cl.
Prereq.: 552 and 751.
Linear topological spaces, normed spaces, Hilbert
spaces, convex sets, integration of vector-valued
functions.

858  (751)  G 3
Introduction to Functional Analysis II
W. 3 cl.
Prereq.: 857.
Continuation of 857.
859 G 3
Introduction to Functional Analysis III
Sp. 3 cl.
Prereq.: 857 and 858.
Banach Algebras, spectral theory, harmonic analysis, fixed-point theorems; applications to analysis.

860 G 3
Algebraic Topology I
A. 3 cl.
Prereq.: 751, 756, and 771.
Metric space topology, complexes in Euclidean spaces, singular homology theory.

861 G 3
Algebraic Topology II
W. 3 cl.
Prereq.: 860.
Continuation of 860.

862 G 3
Algebraic Topology III
Sp. 3 cl.
Prereq.: 861.
Continuation of 860 and 861.

863* (817) G 3
Potential Theory I
A.
Prereq.: 552 and permission of instructor.

864* (818) G 3
Potential Theory II
W.
Prereq.: 863.
Continuation of 863.

865 G 2-5
Topics in Mathematical Physics
Su. A. 2-5 cl.
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

866 G 2-5
Mathematical Problems in Engineering
Sp. 2-5 cl.
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

867 (815) G 5
Dimension Theory
Sp. 5 cl.
Prereq.: 751, 756, and 771.
Dimension in separable metric spaces with application of Euclidean spaces; covering theorems, imbedding theorems, and approximation theorems; relationships between the concept of dimension and measure.

869 G 2-5
Mathematical Theory of Communication and Control
Sp. 2-5 cl.
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

873 G 5
Group Theory I
A. 5 cl.
Prereq.: 773.
Properties of groups, extensions, transfer, generators and defining relations.

874 (872) G 5
Group Theory II
W. 5 cl.
Prereq.: 873.
Continuation of 873.

876 (873) G 5
Analytic Number Theory
A, W. 5 cl.
Prereq.: Permission of instructor.
The distribution of prime numbers; Waring's problems, and selected topics.

877 (880) G 5
Theory of Algebraic Numbers
A, W, Sp. 5 cl.
Prereq.: Permission of instructor.
Ideals in algebraic number fields, unique decomposition theorem, different, discriminant, ideal classes, applications of Galois theory and analytical methods.

931 G 3
Ergodic Theory I
A. 3 cl.
Prereq.: 751.
Measurable transformations, mixing and ergodicity, existence of invariant measures, contraction operations on function spaces, ergodic theorems.

932 G 3
Ergodic Theory II
W. 3 cl.
Prereq.: 931.
Continuation of 931.

933 G 3
Sums of Independent Random Variables I
A. 3 cl.
Prereq.: 830 or 722 and 751.
Limit theorems for sums of independent random variables, infinitely divisible distributions, stable laws.

934 G 3
Sums of Independent Random Variables II
W. 3 cl.
Prereq.: 933.
Continuation of 933.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Type</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>935</td>
<td>Random Walks and Brownian Motion I</td>
<td>W,</td>
<td>3 cl</td>
<td>Prereq.: 830 or 722 and 751. Recurrence, periodicity, hitting probabilities, potential theory, recurrent and transient random walks, Brownian motion.</td>
</tr>
<tr>
<td>936</td>
<td>Random Walks and Brownian Motion II</td>
<td>Sp.</td>
<td>3 cl</td>
<td>Prereq.: 935. Continuation of 935.</td>
</tr>
<tr>
<td>937</td>
<td>Semi Groups and Markov Processes I</td>
<td>W.</td>
<td>3 cl</td>
<td>Prereq.: 751. Sample functions and semi groups generated by Markov processes; general potential theory including Green's function and generalized capacity.</td>
</tr>
<tr>
<td>938</td>
<td>Semi Groups and Markov Processes II</td>
<td>Sp.</td>
<td>3 cl</td>
<td>Prereq.: 937. Continuation of 937.</td>
</tr>
<tr>
<td>949</td>
<td>Seminar in Logic</td>
<td></td>
<td></td>
<td>Prereq.: Permission of instructor. Repeatable to a maximum of 20 cr. hrs.</td>
</tr>
<tr>
<td>950</td>
<td>Topics in Real Analysis</td>
<td></td>
<td></td>
<td>Prereq.: Permission of instructor. Repeatable to a maximum of 20 cr. hrs.</td>
</tr>
<tr>
<td>951</td>
<td>Topics in Complex Analysis</td>
<td></td>
<td></td>
<td>Prereq.: 754.</td>
</tr>
<tr>
<td>953</td>
<td>Topics in Topology</td>
<td></td>
<td></td>
<td>Prereq.: Permission of instructor. Repeatable to a maximum of 20 cr. hrs.</td>
</tr>
<tr>
<td>954</td>
<td>Topics in Algebraic Topology</td>
<td></td>
<td></td>
<td>Prereq.: Permission of instructor. Repeatable to a maximum of 20 cr. hrs.</td>
</tr>
<tr>
<td>957</td>
<td>Topics in Differential Geometry</td>
<td></td>
<td></td>
<td>Prereq.: Permission of instructor. Repeatable to a maximum of 20 cr. hrs.</td>
</tr>
<tr>
<td>959</td>
<td>Measure and Integration I</td>
<td>A.</td>
<td>4 cl</td>
<td>Prereq.: 781. Topics will be chosen from current research papers.</td>
</tr>
<tr>
<td>960</td>
<td>Measure and Integration II</td>
<td>W.</td>
<td>4 cl</td>
<td>Prereq.: 959. Continuation of 959.</td>
</tr>
<tr>
<td>961</td>
<td>Topics in Functional Analysis</td>
<td>Su, W, Sp.</td>
<td>2-5 cl</td>
<td>Prereq.: Permission of instructor. Topics to be chosen from current research papers.</td>
</tr>
<tr>
<td>970</td>
<td>Representation Theory I</td>
<td>A.</td>
<td>5 cl</td>
<td>Prereq.: Permission of instructor. Topics to be chosen from current research papers.</td>
</tr>
<tr>
<td>971</td>
<td>Representation Theory II</td>
<td>W.</td>
<td>5 cl</td>
<td>Prereq.: 970. Continuation of 970.</td>
</tr>
<tr>
<td>972</td>
<td>Combinatorial Analysis</td>
<td>Sp.</td>
<td>5 cl</td>
<td>Prereq.: 771. Topics selected from current research papers.</td>
</tr>
<tr>
<td>973</td>
<td>Homological Algebra I</td>
<td>A.</td>
<td>5 cl</td>
<td>Prereq.: 772. Introduction into the basic concepts of homological algebra.</td>
</tr>
<tr>
<td>974</td>
<td>Homological Algebra II</td>
<td>W.</td>
<td>5 cl</td>
<td>Prereq.: 973 or permission of instructor. Continuation of 973.</td>
</tr>
<tr>
<td>975</td>
<td>Topics in Geometry</td>
<td></td>
<td></td>
<td>Prereq.: Permission of instructor. Topics to be chosen from current research papers.</td>
</tr>
<tr>
<td>978</td>
<td>Theory of Rings</td>
<td>Su, W, Sp.</td>
<td>5 cl</td>
<td>Prereq.: 772. Topics selected from current research papers.</td>
</tr>
</tbody>
</table>
979 (862) G 5 
Theory of Matrices
Su, A, W, Sp. 5 cl.
Prereq.: 771.
Topics selected from current research papers.

980 (865) G 5 
Lattice Theory
Su, A, W, Sp. 5 cl.
Prereq.: 771.
Topics selected from current research papers.

981 G 2-5 
Topics in the Theory of Groups
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

982 G 5 
Topics in Algebra
Su, A, W, Sp. 5 cl.
Prereq.: Permission of instructor.
Topics selected from current research papers.

983 G 2-5 
Topics in Number Theory
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

984 G 5 
Topics in Algebraic Geometry
Su, A, W, Sp. 5 cl.
Prereq.: Permission of instructor.
Topics to be chosen from current research papers.

985 G 2-5 
Seminar in Group Theory
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

986 G 2-5 
Seminar on Algebra
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

987 G 2-5 
Seminar on Commutative Algebra
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

988 G 2-5 
Seminar on Number Theory
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

989 G 2-5 
Seminar on Geometry of Numbers
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

990 G 2-5 
Seminar on Geometry
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

991 G 2-5 
Seminar in Analysis
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

992 G 2-5 
Seminar in Topology
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

993 G 2-5 
Seminar in Applied Mathematics
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

994 (950) G Arr.
Research
Research for thesis or dissertation purposes only.

Mechanical Engineering

Office: 2075 Robinson Laboratory, 205 West 18th Avenue

Professors: Gower (Chairman), Beittler (Emeritus), Bolz, Dobellin, Han, Hornung, Jones, Marco, Marquis (Emeritus), McLarty, Mooff (Emeritus), Sepsy, Smith, Starkey, Stinson (Emeritus), Velkoff, and Zimmerman; Associate Professors: Buxton, Engelman, Lynch, and Moran; Adjunct Associate Professors: Brunton, Epstein, and Redmond; Assistant Professors: Bears, Bridge, Davidson, Foster, Houser, Johnson, Jordon, Krakowski, Kurstedt, and Miller.

281 U 4 
System Dynamics
Sp. 3 cl., I 2-hr. lab.
Theoretical and experimental study of the dynamics of linear, lumped-parameter models of mechanical, electrical, fluid, thermal, and mixed systems.
282† U 4
Mechanical Engineering Analysis
A, W. 3 cl., 1 2-hr. lab.
Prereq.: 281.
Continuation of 281 with additional analytical techniques of general usefulness in mechanical engineering.

301 U 3
Thermodynamics
Sp. 3 cl.
Prereq.: Math. 253 and Physics 133.
Not open to students majoring in Mech. E.
A study of engineering thermodynamics.

500 (601) U G 3
Thermodynamics
A, W, Sp. 3 cl.
Prereq.: Math. 415 and Physics 133.
Not open to students majoring in Mech. E.
Study of macroscopic and microscopic thermodynamics.

501 (607) U G 5
Thermodynamics
A, W, Sp. 5 cl.
Prereq.: Math. 254.
A study of basic engineering thermodynamics.

502 (608) U G 5
Thermodynamics
W, Sp. 5 cl.
Prereq.: 501, or Chem. 531 and Physics 541.
Continuation of 501.

503 (609) U G 5
Fluid Dynamics
A, Sp. 5 cl.
Prereq.: 502.
A basic study of fluid dynamics.

504† U G 4
Fluid Dynamics II
A, Sp. 4 cl.
Prereq.: 502 and 503.
Continuation of 503.

505 (672) U 1
Hydraulic Laboratory
A. 1 3-hr. lab.
Concur.: Civil E. 512.
A study of incompressible fluid flow through various primary elements and through a centrifugal pump.

510 (610) U G 4
Heat Transfer
A, W. 4 cl.
Prereq.: 503 or 605.
Not open to students with credit for 611.
A study of the fundamental laws of heat conduction, radiation, and convection, including an introduction to transient conduction.

511 (621) U 3
Heat Transfer and Fluid Flow
A, W, Sp. 3 cl.
Prereq.: 500.
Not open to students majoring in Mech. E.
A study of the fundamental principles of heat transfer and fluid flow with applications to electrical machinery and apparatus.

520 (614) U G 3
Principles of Heat Generation
A, W. 3 cl.
Prereq. or concurr.: 510.
A quantitative and qualitative study of heat generation including molecular and nuclear processes.

550 (736) U G 5
Machine Design
W, Sp. 5 cl.
Not open to students majoring in Mech. E.
A study of the application of the general principles and empiricism of mechanics of solids to the creative design of mechanical equipment.

551 (615) U G 5
Kinematics of Machines
A, W, Sp. 5 cl.
A study of displacements, velocities, and accelerations of machine members using graphical and numerical methods of analysis.

552 (616) U G 4
Dynamics of Machinery
A, W, Sp. 4 cl.
Not open to students with credit for 620.
A study of the interrelationships among forces, motions, and masses as related to rigid or elastic machine members, including force analysis, vibration, impact, and balancing.

553† U G 5
Kinematics and Dynamics of Machinery
A, W. 5 cl.
Prereq.: 281.
Not open to students with credit for 551-552.
Motion and force analysis in mechanisms such as plane linkages, cams, and gears; introduction to the synthesis of plane linkages and simple cam systems.

588 (770) U 1
Professional Aspects of Mechanical Engineering
A. 1 cl.
Prereq.: Mech. E. Professional Division 3rd yr. standing.
A study of the code of ethics, licensing laws, responsibilities to professional societies, and the relationships to labor and management of the professional engineer.

612 (724) U G 3
Principles of Heat Exchangers
A, W. 3 cl.
Prereq.: 510.
A study of principles of heat and mass transfer as applied to the design of heat exchangers.
Cryogenic Systems
Sp.  3 cl.
Prereq.: 500 or (505) or 503, and 510 and 511.
Study of low-temperature processes and equipment; physical properties at low temperatures; practical application of low-temperature techniques and processes in engineering systems.

Principles of Energy Conversion in Positive Displacement Machinery
A, Sp.  3 cl.
Prereq.: 500 or 503, and (600) or 520.
Not for grad. credit to students majoring in Mech. E.
A study of the principles of energy conversion and transfer; performance and physical characteristics of power-absorbing, power-generating, and power-transmitting positive displacement machinery.

Principles of Energy Conversion in Turbomachinery
W, Sp.  3 cl.
Prereq.: 503 or (605).
Not for grad. credit to students majoring in Mech. E.
A study of the principles of energy conversion and transfer; performance and physical characteristics of power-absorbing, power-generating, and power-transmitting turbomachinery.

Vapor Power Cycles
A.  3 cl.
Prereq. or concur.: 510 and 520.
A descriptive and analytical study of elementary and advanced power plant cycles.

Energy Release and Conversion Processes
A, W.  3 cl.
Prereq.: 504; concur. 510.
Not open to students with credit for 520.
Not for graduate credit to students majoring in Mech. E.
Energy release in combustion, nuclear, electrical, and direct conversion devices.

Energy Conversion in Turbomachinery
W, Sp.  3 cl.
Prereq.: 626.
Not open to students with credit for 624.
Not for grad. credit to students majoring in Mech. E.
Energy conversion in power-producing, -absorbing and -transmitting turbomachinery.

Energy Conversion in Positive Displacement Machinery
A, Sp.  3 cl.
Prereq.: 627.
Not open to students with credit for 621.
Not open for grad. credit to students majoring in Mech. E.
Energy conversion in power-producing, -absorbing and -transmitting positive displacement machinery.

Principles of Environmental Control
A, Sp.  3 cl.
Prereq.: 503.
A study of the principles of the control of environments for human occupation, occupation by other living beings, the operation of mechanical and electrical equipment, and for the storage and processing of materials.

Principles of Mechanical Design
Su, A, W.  4 cl.
Not open for grad. credit to students majoring in Mech. E.
A study of the application of the general principles and empiricisms of mechanics of solids to the creative design of mechanical equipment.

Principles of Mechanical Design
W, Sp.  4 cl.
Prereq.: 552 and 661.
Not open for grad. credit to students majoring in Mech. E.
Continuation of 661.

Principles of Mechanical Design
A, Sp.  4 cl.
Prereq.: 552 and 661.
Continuation of 661.

Lubrication and Bearing Design
A.  3 cl.
Prereq.: 504 or permission of instructor.
Analysis and design of hydrodynamic and hydrostatic bearings using liquid or gas lubricants.

Acoustic Problems in Engineering
W.  3 cl.
Prereq. or concur.: 520, 624, and 662 or permission of instructor.
Preparation for design problems involving noise sources in mechanical systems.

Mechanical Engineering Measurements
A, W.  1 cl., 1 4-hr. lab.
Prereq. or concur.: 510 and 552.
Not open for grad. credit to students majoring in Mech. E.
A theoretical and experimental study of the principles of operation and performance characteristics of measuring instruments used in mechanical engineering.
683 (799) U G 2-10
Individual Studies in Mechanical Engineering
Prereq.: Permission of instructor.
Repeatable to a maximum of 24 cr. hrs. with a maximum of 10 cr. hrs. in any one topic.
This course is intended to give the advanced student opportunity to pursue special studies not otherwise offered; work undertaken will be selected from automotive and internal combustion machinery, combustion and fuels, heat transfer, heating, ventilating, air conditioning, industrial hydraulics, machine design, refrigeration, steam power plants, and thermodynamics.

687 (710) U G 3
Introduction to Design in Biomedical Engineering
W. 3 cl.
Prereq.: Elec. E. 670 or permission of instructor.
Introduction of engineering students to design problems in biomedical engineering: analysis in biomechanics, bio-fluid mechanics, diffusion, and elementary physiology.

700 (703) U G 3
Transport Processes
Su. A. 3 cl.
Prereq.: 510 and Math. 255; or equiv.
A parallel, systematic study of the three transport processes of mass, momentum, and energy from the continuum viewpoint. Moran.

720 (704) U G 3
Internal Combustion Engines
A. 3 cl.
Prereq. or concurs.: 520 or permission of instructor.

721 (705) U G 3
Internal Combustion Engines
W. 3 cl.
Prereq. or concurs.: 520 or permission of instructor.
Force analysis as related to the design of engine components such as pistons, bearings, valve springs, and crankshafts. Engelman.

722 (725) U G 3
Diesel Engines
Sp. 3 cl.
Prereq. or concurs.: 520 or permission of instructor.
An advanced study of Diesel engine operation, and economics. Engelman.

724 (726) U G 3
Gas Turbine Power Plants
W. 3 cl.
Prereq. or concurs.: 520 and 624; or permission of instructor.
A study of the principles, performance, and design of gas turbine power plants. Engelman.

726 (755) U G 3
Nuclear Power Plants
Sp. 3 cl.
Prereq.: 510 or (611), and (727) or 550 or 661, and Physics 472 or 571.
A study of the thermal and mechanical design aspects of nuclear power plants and processes. Glower.

741 (710) U G 4
Heating, Ventilating, and Air Conditioning
A. 4 cl.
Prereq.: 530 and 640.
A study of practices, components, and systems for conventional and unique air conditioning equipment used to control the environment for human occupancy, storage, and industrial processes. Seply.

742 (715) U G 3
Refrigeration and Air Conditioning
W. 3 cl.
Prereq.: 503.
A study of fundamentals, processes, and equipment associated with refrigeration systems using vapor compression, air cycle, absorption, magnetic, and thermo-electric cooling. Seply.

761 (771) U G 3
Mechanical Engineering Design I
A, W, Sp. 3 2-hr. lab.
Prereq.: 662 and 663.
Not open for grad. credit to students majoring in Mech. E.
The methodology of intermediate design and practice in the design of a specific system which may utilize principles of any or all mechanical engineering disciplines. Foster.

762 (772) U G 3
Mechanical Engineering Design II
W, Sp. 3 2-hr. lab.
Prereq.: 761.
Not open for grad. credit to students majoring in Mech. E.
The methodology and practice in the preliminary design of an optimum system to fulfill a specified need utilizing principles of several mechanical engineering disciplines. Foster.

763 (773) U G 3
Mechanical Engineering Design III
A. Sp. 3 2-hr. lab.
Prereq.: 762.
Not open for grad. credit to students majoring in Mech. E.
Continuation of 762.

770 (761) U G 4
Advanced Mechanical Engineering Instrumentation
W. 3 cl., 1 2-hr. lab.
Prereq.: (664) or 670, or equiv.
A theoretical and experimental study of measurement instrumentation: emphasis on both principles of operation and analysis and design techniques for measurement systems of a mechanical and electromechanical nature. Doebelin.
771 (762) UG4
Principles of Automatic Control
W, Sp. 3 cl., 1 2-hr. lab.
Prereq.: 510, 520, and 670, or permission of instructor.
A theoretical and experimental study of the principles of operation of feedback control systems, including servomechanisms and process controls. Doeblin.

772 (763) UG4
Control Systems Design
Sp. 3 cl., 1 2-hr. lab.
Prereq.: (760) or 771 or permission of instructor.
A study of the theoretical and experimental procedures involved in the design of feedback control systems including servomechanisms and process control. Doeblin.

781 (779) UG3
Mechanical Engineering Laboratory
A, W, Sp. 2 2-hr. lab. and 5 hrs. lab. planning and report writing.
Prereq.: (665) or 670.
Not open for grad. credit for students majoring in Mech. E.
The study and application of methods of experimental analysis. Buxton.

782 (780) UG3
Mechanical Engineering Laboratory
A, Sp. 2 2-hr. lab. and 5 hrs. lab. planning and report writing.
Prereq.: 781.
Continuation of 781. Buxton.

794 (796) UG3-5
Group Studies in Mechanical Engineering
Prereq.: Permission of instructor.
Repeatable to a maximum of 12 cr. hrs.
Advanced topics in the various phases of mechanical engineering; the particular topics, the number of credit hours, and the instructor will be announced in the quarter previous to the one in which the course is offered.

801 G3
Gas Dynamics
Sp. 3 cl.
Prereq.: 504 and Math. 255, or equiv.
An analytical study of one and two dimensional steady flow and one dimensional unsteady flow. Beans.

802 G3
Fundamentals of Thermodynamics I
W. 3 cl.
Prereq.: 502 and Math. 255, or equiv.
A study of thermodynamics fundamentals from the classical viewpoint. Beans.

803 G3
Fundamentals of Thermodynamics II
Sp. 3 cl.
Prereq.: 802 and Math. 421, or equiv.
Introduction to the fundamentals of thermodynamics from the microscopic viewpoint. Beans.

804* G3
Advanced Applied Thermodynamics
Sp. 3 cl.
Prereq.: 700 and 802.
A study of thermodynamics as applied to propery interrelationships and to irreversible phenomena. Moran.

807 G3
Advanced Heat Transfer
W. 3 cl.
Prereq.: 510, and 881 or Math. 512 or 557.
A study of the general heat transfer equations and their applications to heat transfer in solids and through fluids the use of numerical and graphical analysis will be included. Han.

809* G3
Advanced Heat Transfer
A. 3 cl.
Prereq.: (808) and Math. 255, or equiv.
A study of phase change and radiative heat transfer processes. Johnson.

810 (853) G3
Dynamics in Inviscid Fluids
A. 3 cl.
Prereq.: 503, and 881 or Math. 512, or equiv.
Not open to students with credit for (808) or (850).
Three-dimensional, compressible, and incompressible inviscid flows, including irrotational and rotational motion with and without flow discontinuities. Han.

811 (854) G5
Laminar Flow and Heat Transfer
W. 5 cl.
Prereq.: 510 and 810.
Not open to students with credit for (808) or (850).
Laminar boundary layers and fluid flow with and without heat transfer, fully established entrance flows, free convection, and extensions to compressible flows. Han.

812 (855) G5
Turbulent Flow and Heat Transfer
Sp. 5 cl.
Prereq.: 811.
Not open to students with credit for (808) or (850).
Turbulent boundary layers and flows with and without heat transfer for internal and external flows including laminar instability, Reynolds stresses, and mixing length theory. Bridge.

820 (810) G3
Internal Combustion Power Plants
W. 3 cl.
Prereq.: 621 or equiv.
An advanced study of reciprocating internal combustion power plants. Engelman.

821* (811) G3
Advanced Principles of Energy Conversion in Turbomachinery
Sp. 3 cl.
Prereq.: 624 or equiv.
An advanced study of power-absorbing, generating, and transmitting turbomachinery. Jones.
Preliminary Design of Power Systems
A. W. Sp. Conf.
Prereq.: Permission of instructor.
Repeatable to a maximum of 18 cr. hrs.
Preliminary design and evaluation of novel systems
including analysis, synthesis, and possible experimental
verification. Engelman and Jones.

Advanced Steam Power Cycle
W. 3 cl.
Prereq.: 503 or (605); 510 and 624.
An advanced study of steam power cycles and design
of steam turbine nozzles and blading. Buxton.

Advanced Combined Vapor Power Cycle Analysis
Sp. 3 cl.
Prereq.: (605) and 823, or permission of instructor.
A study of conventional and novel binary vapor cycles
and combined vapor-gas power cycles. Buxton.

Advanced Vapor Power Cycle
A. W. Sp. Conf.
Prereq.: 823 or 824, or permission of instructor.
Repeatable to a maximum of 18 cr. hrs.
Courses to be conducted on a conference basis with
problems assigned to each student based on his
needs and area of interest. Buxton.

Combustion
Sp. 3 cl.
Prereq.: 700 or permission of instructor.
A study of chemical thermodynamics and kinetics, the
basic equations of change, and application of
fundamentals to combustion in engineering systems.
Johnson.

Introduction of Electro and Magneto
W. 3 cl.
Prereq.: 510 and Math. 513, or permission of instructor.
A study of the interactions of electric and magnetic
fields with liquids and gases. Velkoff.

Advanced Environmental Control Refrigeration
W. 3 cl.
Prereq.: 741 or equiv.
Advanced study of conventional and novel processes
including thermoelectric, magnetic, and gas systems.
Sepsky.

Advanced Environmental Control
Sp. 3 cl.
Prereq.: 640 or equiv.
An advanced study of conventional and unique systems
used to control the environment for occupancy by
people, equipment, and material. Sepsky.
998 (990) G 2
Mechanical Engineering Seminar
A, Sp.  4 cl.
Prereq.: Mech. E. grad. standing.
A study of the frontiers of knowledge in mechanical engineering by a group of reading in technical literature, student presentations, and related group discussions.

999 (950) G Arr.
Research in Mechanical Engineering
Research for thesis or dissertation purposes only.

Medical Communications
(School of Allied Medical Professions)
Office: A-350 Starling Loving Hall, 320 West Tenth Avenue
Associate Professor Schoen (Division Director); Instructor Kreutzfeld.

550 U 8
Medical Communications Media I
W.  5 3-hr. cl., 3 2-hr. clinical experience.
Prereq.: Senior standing in Med. Comm. and permission of instructor.
Study and application of educational uses of communication processes and media in a health setting. Schoen and Kreutzfeld.

560 U 8
Medical Communications Media II
Sp.  3 1-hr. cl., 5 2-hr. clinical experience.
Prereq.: 550.
Diagnosis and planning for communication services in various health environments. Schoen and Kreutzfeld.

Medical Dietetics
(School of Allied Medical Professions)
Office: B-310 Starling Loving Hall, 320 West Tenth Avenue
Professor Lewis (Division Director); Associate Professors Allred, Anderson, Mason, Casbergue, Scobie, and Wemberg; Assistant Professors Burke, Bussell, Kuniel, Marteney, Seubert, Sharp; Instructor Brunner Gordon, Krom.

201 (501) U 1
Introduction to Medical Dietetics
W.  2 cl.
Basic knowledge and experience in functional and sociological aspects of responsibilities of the medical dietitian. Lewis and Staff.

410 (510) U 6
Introduction to Patient Dietary Care
Su, A.  4 cl., 6-hr. clinical study.
Prereq.: Home Ec. 310.
Not open to students with credit for 310.
Principles and practice in the dietary care of the hospital patient. Seubert.

411 U 1
Electronic Data Processing in Dietetics
Su, A.  1 cl., clinical experience.
Prereq.: Enrollment in Med. Diet. or permission of instructor.
Introduction to basic computer concepts and the application of these concepts to dietetic systems. Casbergue.

421 (515) U 6
Management in Dietetics
A.  2 cl., 2 4-hr. lab.
Prereq.: Home Ec. 314.
Management in food service systems emphasizing quality of food, production planning, work organization, financial controls in quantity food preparation for regular and modified diets. Casbergue, Bussell, and Gordon.

422 (516) U 6
Management in Dietetics
W.  3 cl., 3 3-hr. lab.
Prereq.: 421.
Principles and recent trends in menu planning and food procurement in food service systems; responsibility for writing and implementing menus in hospital food services. Casbergue.

521 U 5
Nutrition and Human Metabolism
W.  4 cl., 2-hr. clinical study.
Prereq.: Home Ec. 310, Physiol. Chem. 312 or concur., Physiol. 312 or equiv.; Junior standing or permission of instructor.
The metabolism of essential nutrients at the cellular and intact levels of organization, energy balance, and composition of human body. Seubert and Martin.

522 U 5
Nutrition and Human Metabolism
Sp.  4 cl., 2-hr. clinical study.
Prereq.: 521.
A continuation of 521.

631 (601) U 6
Nutrition in Disease
Sp.  5 cl., 4-hr. clinical study.
Prereq.: 310 and 521.
Causes, results, and dietary management of alterations in nutritional processes. Lewis and Medical Staff.

632 (602) U 6
Nutrition in Disease
Su.  5 cl., 4-hr. clinical study.
Prereq.: 631.
A continuation of 631.
636  (626)  U 3
Teaching of Dietetics
Su. 2 cl., 3-hr. clinical study.
Prereq.: Med. Diet. senior standing.
Educational principles and practices as applied to the
Teaching responsibilities of the dietitian. Wenberg.

637  (627)  U 3
Community Nutrition
Su. 2 cl., 4-hr. clinical study.
Prereq.: 632 or permission of instructor, concur. 636.
Public health nutrition programs and their services
to the community, with particular reference to
Nutrition problems of special groups of the population.
Scobie.

638  (628)  U G 3
Pediatric Nutrition
Su., A. 3 cl.
Prereq.: Grad. or senior standing in Med. Diet. and
permission of instructor.
The nutrition of children; the influence of physical,
psychological, and social growth and development from
Infancy through adolescence. Anderson and Pediatric
Staff.

644  (620)  U 10
Advanced Medical Dietetics I
A. 4 cl., 4-hr. conf., 20-hr. clinical study.
Prereq.: 422 and 632.
Advanced study of disturbed metabolic processes
affecting human nutrition and evaluation of complex
dietetic problems accompanying them. Burke and
Russell.

645  (622)  U 10
Advanced Medical Dietetics II
W. 4 cl., 4-hr. conf., 20-hr. clinical study.
Prereq.: 644.
Continuation of 644.

646  U G 10
Advanced Therapeutic Dietetics III
W., Sp. 4 cl., 4-hr. conf., 20-hr. clinical study.
Prereq.: 645, senior or grad. standing and permission
of instructor.
Continuation of 645.

693  (785)  U G 1-5
Individual Studies in Nutrition or Dietetics
Prereq.: Grad. or senior standing in Med. Diet. and
permission of instructor.
Problems in various phases of nutrition or medical
dietetics not included in current course offerings. Lewis
and Staff.

830  G 3
World Nutrition
W. 2 1½-hr. cl.
Prereq.: Permission of instructor.
Not open to students with credit for Prev. Med. 830.
A multidisciplinary approach to the study of nutrition
in developing countries; emphasis on food supply,
nutritional status, infant and child malnutrition and
nutrition survey methods.

856  G 3
Nutrition in Systemic Disease
W. 2 1½-hr. cl.
Prereq.: Permission of instructor.
Not open to students with credit for Prev. Med. 856.
The physio-pathological background of systemic disease
and the rationale of specific diets in their prevention
and treatment. Anderson and Medical Staff.

858  G 3
Community Nutrition
A. 2 1½-hr. cl.
Prereq.: 638 and 856, or permission of instructor.
Not open to students with credit for Prev. Med. 858.
Methods of discovering problems in public health
nutrition and practical application of nutrition
information for improvement of nutritional status
at various age levels. Anderson.

898  G 1
Interdepartmental Seminar in Nutrition
and Food Technology
(See under Interdepartmental Seminars, University
Academic Policies and Course Offerings catalog.)

Medical Illustration
(School of Allied Medical Professions)
Office: N-431 University Hospital, 410 West Tenth
Avenue
Instructor Kreutzfeld (Acting Division Director);
Assistant Professor Shepard (Emeritus); Instructors
Ollila and Prosser.

100  U 0
Medical Illustration Field Experience
Prereq.: Permission of instructor.
Practical application of medical illustration techniques
in a functioning hospital department or medical
illustration.

693  U 5
Individual Studies
Prereq.: Permission of Instructor.
Repeatable to a maximum of 45 cr. hrs.
Advanced study for students in medical illustration
including preparation of charts, graphs, medical and
surgical illustrations, exhibits and general work for a
medical center.
Medical Microbiology
Office: 5072 Medical Basic Science Building, 370 West Ninth Avenue

Professors: Cramblett (Chairman), Hamparian, Kapral, Macpherson, Saslaw, and Somerson; Associate Professors Bowmen, Lang, Ottolenghi, and Schmitt; Assistant Professors Conant, Haynes, Pollack and Thomas; Instructor Torbet.

624 Medical Microbiology
A. 3 hr. lect., 2 2-hr. lab.
Prereq.: Grad. standing or Med. 2nd yr. standing. Morphologic, physiologic, and serologic characteristics of pathogenic microorganisms; the epidemiology and pathogenesis of infectious diseases; methods of diagnosis, prevention, and treatment. Cramblett and Staff.

625 Medical Microbiology
W. 4 1-hr. lect., 2 2-hr. lab. for 5 wks.
Prereq.: 624. Continuation of 624. Cramblett and Staff.

626 Medical Microbiology
Sp. 1 cl.
Prereq.: 625 or permission of instructor. Application of basic principles of medical microbiology to infectious diseases; continuation of 625. Cramblett and Staff.

744 Clinical Medical Mycology
Sp. 2 cl., 1 1-hr. lab.
Prereq.: 624, 625, and permission of instructor; Bot. 620.51 recommended. An advanced course in medical mycology with emphasis on isolation of human pathogenic fungi from patients; comprehensive laboratory diagnosis; serology; microscopic pathology; staining; and animal applications. Pollack.

754 Medical Virology
W. 3 1-hr. lect.
Prereq.: 625; Biochem. 613 or 709 and 623 or 710, or Physiol. Chem. 611 and 612, or permission of instructor. Primary emphasis on viruses important to man; fundamental properties of viruses, host cell-virus interaction, pathogenesis, and immunity. Hamparian, Conant, Thomas, and Cramblett.

755 Medical Virology
Sp. 1 1-hr. lect. and 3 2-hr. lab.
Prereq.: Permission of instructor. The fundamental principles of methods commonly used for handling and studying viruses in the laboratory.

764 Bacteriophagy
Sp. 2 1-hr. lect., 2 2-hr. lab.
Prereq.: 625 or permission of instructor. Various phage-bacterium systems used to study and to exemplify basic mechanisms involved in virus infections. Bowman.

793 Individual Studies in Medical Microbiology
Prereq.: Med. 3rd or 4th yr. standing or permission of instructor. (When registration is for 3 professional cr. hrs., an additional 3 hr. professional course must be taken.)

793.01 Diagnostic and Clinical Virology
1, 2, or 3 months.

793.02 Problems in Virology
Su, A, W, Sp. 3 months.
Must repeat to 18 cr. hrs. for professional credit.

793.03 Problems in Experimental Bacterial Viruses
1, 2, 3, or 4 months.
Repeatable to a maximum of 24 cr. hrs. for professional credit.

793.04 Problems in Mycoplasma Research
3 or 4 months.
Must repeat to 18 or 24 cr. hrs. for professional credit.

793.05 Medical Immunology
1, 2, 3, or 4 months; offered all months.
Repeatable to a maximum of 24 cr. hrs. for professional credit.

793.06 Problems in Medical Microbiology
1, 2, 3, or 4 months; offered all months.
Repeatable to a maximum of 24 cr. hrs. for professional credit.

Clinical Microbiology
(See Path. 793.07)

Infectious Diseases
(See Ped. 793.03)

794 Infectious Diseases

1 month, offered all months.
Prereq.: 624 and 625, or equiv.; permission of instructor. (When registration is for 3 professional cr. hrs., an additional 3 hr. professional course must be taken.)

794.01 Immunological Diseases
Directed reading and discussion of human diseases with immunological features; primary attention is directed toward the immunological phenomena underlying connective tissue and specific organ diseases. Lang.
814  G 1
Seminar in Medical Microbiology
Prereq.: Med. Microbiol. grad. standing or permission of instructor.
Repeatable with permission of instructor to a maximum of 9 cr. hrs.

834*  G 5
Experimental Medical Microbiology
Sp. 2 cl., 2 4-hr. lab.
Prereq.: 624, 625, and permission of instructor.
Repeatable to a maximum of 10 cr. hrs.
An advanced course in the theory, practice, and analysis of current experimental procedures used in the study of human microbial pathogens. Lang, Pollack, and Thomas.

8441*  G 2
Mycoplasma, Rickettsiae, and Bedsoniae
Sp. 2 1-hr. lec.
Prereq.: 625 or Microbiol. 607.
Mycoplasmas and L-forms, members of the Bedsoniae group, Rickettsiae and Trachoma agents. Somerson and Pollack.

8541*  G 3
Molecular Basis of Antibiotic and Chemotherapeutic Action
Sp. 3 1-hr. lec.
Prereq.: 625; Physiol. Chem. 612; or Biochem. 612 or 707 and 622 or 708; or Microbiol. 761; or permission of instructor.
Action of antibiotic and chemotherapeutic agents on specific sites in the metabolism and/or structures of cells stressing the comparative biochemistry of bacterial and animal cells. Ottolenghi.

864  G 3
Dynamic Aspects of Bacterial Infections
Sp. 3 1-hr. lec.
Prereq.: 625 or Microbiol. 625 or equiv. or permission of instructor.
An analysis of the dynamic interrelationships between the host's and parasite's inherent physiological capabilities and how these expressions (other than specific immunity) are mutually modified. Kapral and Ottolenghi.

994  G 2-6
Group Studies in Medical Microbiology
Prereq.: Permission of instructor.
Repeatable to a maximum of 24 cr. hrs.
Investigation of special areas of medical microbiology.

999  G Arr.
Research in Medical Microbiology
Research for thesis or dissertation purposes only.

Medical Technology
(School of Allied Medical Professions)
Office: N-329 University Hospital, 410 West Tenth Avenue

Professor Macpherson (Division Director); Assistant Professor Sutton (Assistant Division Director);
Professor Stevenson; Assistant Professors Earp and van Scoetbergen; Instructors Torbet and Wilson.

For related courses see Pathology.

511  (640)  U 9
Medical Technology Laboratory
Su. 27 lab. hrs.
Prereq.: Med. Tech. 4th yr. standing.
Laboratory demonstrations and practice in hematologic techniques, clinical microbiology, and urinalysis. Stevenson, Frazier, and Mast.

512  (641)  U 9
Medical Technology Laboratory
A. 27 lab. hrs.
Prereq.: Med. Tech. 4th yr. standing.

513  (643)  U 9
Medical Technology Laboratory
W. 27 lab. hrs.
Prereq.: Med. Tech. 4th yr. standing.
Tissue technique; mycology and parasitology. Wilson and Gregory.

514  (642)  U 9
Medical Technology Laboratory
Sp. 27 lab. hrs.
Prereq.: Med. Tech. 4th yr. standing.
Demonstrations and applied techniques in the quantitative chemistry of blood and other body fluids. Brunner.

515  (646)  U 10
Clinical Practice in Medical Technology
Su, A, W, Sp. 5 8-hr. labs.
Prereq.: 511, 512, 513, and 514.
Application of medical laboratory techniques under supervision in the clinical laboratories of University Hospital, Macpherson and Staff.
575 (675)  P 0  
Thoughts in Medicine
W. 1 cl.
Prereq.: Med. 1st yr. standing.
This course stresses the importance of knowing some of the
historical aspects of medicine; material is presented in terms of the future development of
medicine as a science.

601  P 4  
The Comprehensive Evaluation of the Patient
A.
Prereq.: 2nd yr. standing.
(601, 602, and 603 offered in cooperation with the Deps.
Med., Psychiatry, Radiol., and Surg.)
Integrated interdisciplinary experiences in clinical
settings; emphasis on patient problems, pediatric or
adult, bedside instruction, seminars, demonstrations,
and lectures by faculty of all clinical departments.

602  P 3  
The Comprehensive Evaluation of the Patient
W.
Prereq.: 601.
Continuation of 601.

603  P 13  
The Comprehensive Evaluation of the Patient
Sp.
Prereq.: 602.
Continuation of 602.

651  P 2  
Principles of Medicine
Sp. 2 cl.
Prereq.: Dent. 3rd yr. standing.
A survey course in medicine to dental students
considering the Infectious, deficiency, and systemic
diseases; representative diseases are selected for
detailed consideration and demonstrations.

714  P 6  
Ward Clinics in Infectious Diseases
1 month, offered all months except June.
Prereq.: Med. 3rd or 4th yr. standing.
(Daily formal instruction from 8 a.m. to 6 p.m.;
student on call throughout 24 hours daily.)
Clerkship and seminars on common and unusual
infectious diseases. Saslaw.

715  P 6, 12, or 18  
Clinical Medicine
4 months, offered July, Nov., Mar.
Prereq.: Med. 3rd yr. standing.
Must repeat to 24 cr. hrs.
(Daily formal instruction from 8 a.m. to 6 p.m.; student
on call throughout 24 hours daily.)
Four months' clerkship in medicine; experience in
Outpatient Department and in inpatient Services.

716  P 6  
Ward Clinics in Pulmonary Disease
1 month, offered all months except June.
Prereq.: Med. 3rd or 4th yr. standing.
(Daily formal instruction from 8 a.m. to 6 p.m.; student
on call throughout 24 hours daily.)
Clerkship and seminars on pulmonary diseases.

740  P 6, 12, 18  
Ambulatory Clinics in Medicine
1 month, offered all months except June.
Prereq.: Med. 4th yr. standing.
Repeatability to a maximum of 18 cr. hrs.
The diagnosis and treatment of ambulatory patients
with general and special medical problems.

751  P 6, 12, 18  
Medical Clerkships
1 month, offered all months except June.
Prereq.: Med. 4th yr. standing; 3rd yr. standing, 715
or permission of instructor.
Repeatability to a maximum of 18 cr. hrs.
(Daily formal instruction from 8 a.m. to 6 p.m.; student
on call throughout 24 hours daily.)
Ward clerkship in the following subspecialties of
medicine, with bedside, didactic, and seminar
information.
751.01 Allergy
751.02 Cardiology
751.03 Dermatology
751.04 Endocrinology
751.05 Gastroenterology
751.06 Genetics
751.07 Hematology
751.08 Neurology
751.09 Renal Diseases
751.10 Rheumatology
751.11 Advanced Clinical Clerkships
Basic Science Review
1 month, May.
Prereq.: Med. 4th yr. standing; concurs. Pharmacol. 770.
Didactic review of new basic science developments;
practice in electrocardiographic and phonocardiographic
interpretation; elements of office practice and
community relations.

Individual Studies in Medicine
All months, 1 or more months to be elected.
Prereq.: Med. 3rd or 4th yr. standing and permission
of division chief.
Research on a minor problem under faculty supervision
in the following specialties of medicine:

- Allergy
- Cardiology
- Dermatology
- Endocrinology
- Gastroenterology
- Genetics
- Hematology
- Infectious Diseases
- Neurology
- Pulmonary Diseases
- Renal Diseases
- Rheumatology

Internship in Medicine
12 months full-time, beginning July 1.
Prereq.: Appointment as Intern, University Hospital.
Repeatable to a maximum of 216 cr. hrs.
Rotation through medical ward services and hospital
emergency room; primary responsibility for patient
care; attending and work rounds; staff conferences.

Residency in Medicine
12 months full-time, beginning July 1.
Prereq.: Appointment as Resident, University Hospital.
Repeatable to a maximum of 216 cr. hrs.
Rotation through medical subspecialty, clinical, and
outpatient services; consultative activities, supervisory
and teaching responsibilities in patient-care team;
rounds; conferences.

Seminar in Medicine
Prereq.: Permission of instructor.
Discussion of pertinent literature and research projects
in various subspecialty areas with emphasis on basic
science concepts. Warren and Staff.

Neurology
Pulmonary Diseases
Renal Diseases
Rheumatology

Research in Medicine
Research for thesis or dissertation purposes only.

Medicine, College of

Office: 219 Medical Basic Science Building, 370 West
Ninth Avenue

The Development of Medicine and the
Medical Profession
A, W, Sp. 10 cr.
Prereq.: Enrollment in the College of Medicine.
The evolution of the theory and practice of medicine
and of the social role of the physician from the
earliest times. Burnham.

Introduction to Medicine
Su.
Prereq.: Enrollment in the College of Medicine.
Introducing basic concepts of major disease
mechanisms, with patient-centered learning; study of
the health care delivery systems and the resources of
medical information services.

Nature of Life Processes in Medicine I
Su.
Concur.: 651.
Macrostructure, microstructure, and function of the
human body including biochemistry reactions and
normal defense mechanisms; study of human behavior,
growth, and development; introduction to the tools of
physical diagnosis.

Nature of Life Processes in Medicine II
A.
Prereq.: 652.
Repeatable to a maximum of 36 cr. hrs.
Continuation of 652.

The Pathophysiology and Manifestation of
Disease I
W.
Prereq.: 653.
Multidisciplinary presentation of disease mechanisms
and pharmacodynamics correlating structure and
function with its cardinal manifestations; elective
experience in basic science fields; clinical learning in
outpatient setting.
Metallurgical Engineering

Office: 141A Metallurgical Building, 116 West 19th Avenue

Regents Professor Fontana (Chairman); Professors Alfrey (Battelle Visiting), Beck, Hirth, Powell, Rapp, Speiser, Spretnak, St. Pierre, and Williams; Adjunct Professor Parsons; Associate Professors Meyrick and Stachel; Assistant Professors Boorstein and Rigney.

200 U 3
Introduction to Metallurgical Engineering
A. 3 cl.
Prereq.: 2nd yr. standing in Met. E.
Historical development of metallurgy; science versus engineering; the design function and professional responsibilities; experimental techniques and the information problem in metallurgy. Spretnak.

300 U 4
Materials Science
W. 4 cl.
Prereq.: Chem. 204.
The structure of materials and the correlation of structure to physical and mechanical behavior; advanced materials and environmental effects. Spretnak.

301 U 3
Materials Science
A, Sp. 3 cl.
Prereq.: Chem. 204.
The atomic and microscopic structure of materials and the control of structure to affect the physical and mechanical properties.

330 U 3
Metallurgical Thermodynamics
Sp. 3 cl.
Prereq.: Chem. 205.
Fundamental concepts of thermodynamics and their application to systems of metallurgical interest; introduction to the laws of thermodynamics, principles, of chemical equilibrium, and solution behavior. Boorstein.

410† (501) U 4
Foundry Technology
A. 3 cl., 1 2-hr. lab.
Concur.: 440.
Survey of melting procedures, fundamentals of freezing metals, bases in metals, cast structures and properties, and production of machine components by casting techniques. Williams. Fee.

430 (661) U 4
Chemical Metallurgy I
A. 3 cl., 1 3-hr. lab.
Prereq.: 330 or equiv.
Metallurgical calculations; energy and mass balances; analysis of steady and non-steady state processes; heat and mass transfer applied to metallurgical processes. Rapp.
431 U 4  Chemical Metallurgy II
W. 3 cl., 1 3-hr. lab.
Prereq.: 430; Chem. 322.
Graphical representation of phase equilibria including important M-O-C and M-O-S systems; treatment of gas-solid reaction kinetics including oxidation, reduction, evaporation, retorting, etc.; electrochemical metallurgy processes. St. Pierre.

440 U 3  Physical Metallurgy I
Sp. 3 cl.
Physical properties of pure metals and single phase alloys; solid solutions. Powell and Rigney.

450 U 4  Physical Metallurgy II
A. 3 cl., 1 3-hr. lab.
Prereq.: 440.
Defects in crystals; diffusion; recovery, recrystallization, and grain growth in metals and alloys. Powell.

451 U 4  Physical Metallurgy III
W. 3 cl., 1 3-hr. lab.
Prereq.: 450.
Phase rules; unary, binary, and ternary phase diagrams. Hirth.

489 U 5  Industrial Experience
A. 5 cr. hrs. for each summer's work.
Repeatable to a maximum of 10 cr. hrs.
Register for course and submit report on experience during the Autumn Quarter following the summer in which industrial experience was obtained; two summers of 20 weeks of approved work in metallurgical industries. Williams.

500 U G 4  Physical Metallurgy of Steels
Sp. 4 cl.
Prereq.: 451.
Decomposition of austenite and the hardenability of steels; tempering of martensite. Rigney.

502 U G 3  Advanced Structure of Materials
W. 3 cl.
Prereq.: 300, 301, or equiv.
Not open to students majoring in Met. E.
Means of obtaining and controlling microstructure; relationship of structure to properties; survey of alloy systems; environmental limitations of materials. Beck.

520 U G 4  Chemical Metallurgy III
W, Sp. 3 cl., 1 3-hr. lab.
Prereq.: 431 or permission of instructor.
W. for 5-yr. program; Sp. for 4-yr. program.
Structure and properties of liquid metals and alloys; thermodynamics of liquid metallic solutions; liquid metal-gas and slag reactions; solidification and zone refining. Rapp. Fee.

521 U G 4  Principles of Extractive Metallurgy II
Sp. 3 cl., 1 3-hr. lab.
Prereq.: 520.
Refining of alloys; vapor pressure; precipitation from liquid alloys; gases in metals; segregation and zone melting; partitioning. St. Pierre. Fee.

530 U G 4  Metallurgical Thermodynamics
A. 3 cl., 1 3-hr. lab.
Prereq.: 431.
Fundamental principles of thermodynamics; development of the important concepts and equations of thermodynamics; metallurgical solutions—activity behavior; heterogeneous equilibria and application to phase diagrams. Boorstein. Fee.

550 U G 4  Physical Metallurgy IV
A, Sp. 3 cl., 1 3-hr. lab.
Prereq.: 451.
A, for 5 yr. program; Sp. for 4 yr. program.
Principles of phase transformations in the solid state.

551 U G 3  Physical Metallurgy V
W. 3 cl.
Prereq.: 550.
Relationship of physical and mechanical properties to microstructure; quantitative metallography. Meyrick.

552 U G 3  Physical Metallurgy VI
Sp. 3 cl.
Prereq.: 551.
Physical metallurgy of steels; austenite decomposition; hardenability; heat treatment; alloying effects. Hirth.

560 U G 3  Mechanical Metallurgy
A, Sp. 3 cl.
A. for 5 yr. program; Sp. for 4 yr. program.
Behavior of metals under simple and combined stress systems; elements of elastic theory, plastic deformation, dislocation theory, strength theories, and fracture. Spretnak.

589 U 2  Inspection Trip
Sp. Taken between W. and Sp. Qtrs.
One week trip to visit industrial plants and laboratories; report required; maximum expense $50.00. Williams.

590 U G 2  Metallography I
A. 1 4-hr. lab.
Concur.: 451.
Principles and practice of metallography. Parsons.
Fee.
591 (672) U G 2
Metallurgy II
W. 1 4-hr. lab.
Prereq.: 590.
Continuation of 590. Parsons. Fee.

592 (673) U G 2
Metallurgy III
Sp. 1 4-hr. lab.
Prereq.: 591.
Continuation of 591. Parsons. Fee.

610 (721) U G 3
Foundry Molding Materials
A. 3 cl.
Prereq.: 410 and Mineral 414.
A study of materials used in compounding of sand mixtures and the effect of thermal shock upon the properties of molded masses. Williams.

611 (722) U G 3
Foundry Molding Methods, Gating, and Risering
W. 3 cl.
Prereq.: 410 and 420.
The manufacture of sand molds by various methods; gating and risering—a study of fluid flow and solidification to produce sound castings. Williams.

615 (745) U G 3
Shaping and Forming of Metals
W. 3 cl.
Prereq.: 660.
Fundamental aspects of deformation of metals by forging, rolling, wire drawing, tube drawing, extrusion, piercing, and deep drawing. Spretnak.

620 (763) U G 3
Process Metallurgy
W. 3 cl.
Prereq.: 521.

635 (730) U G 3
Corrosion
A, Sp. 2 cl. 1 2-hr. lab.
Prereq.: Engr. 4th yr. standing.
Fontana. Fee.

670 (759) U G 3
Engineering Metallurgy I
A. 3 cl.
Prereq.: 551.
Basic properties of metals and alloys, cost structure, design factors, specifications, and statistical methods; selection of metals and alloys, service failures. Spretnak and Staehle.

671 (760) U G 3
Engineering Metallurgy II
W. 3 cl.
Prereq.: 670.
Continuation of 670. Spretnak and Staehle.

675 (716) U G 3
Materials of Nuclear Technology
A. 3 cl.
Prereq.: 300, 301, or equiv.
The physical metallurgy of reactor materials; the effects of reactor environment on the structure, and on the physical and mechanical properties of these materials. Staehle.

693 (710) U G 1-6
Metallurgical Investigations
Su, A, W, Sp. 1 cl., 2 to 4 3-hr. lab.
Prereq.: Permission of dept.
Repeatability to a maximum of 9 cr. hrs.
The class is divided into groups for investigation along the lines of their special interests as follows:
  a. The properties of metals and alloys.
  b. Production and refining of metals.
  c. Metallurgical equilibria.
  d. Corrosion engineering.
  e. Foundry.
All investigations are under the close direction of instructors; comprehensive report required.

710 (724) U G 3
Casting Control
Sp. 3 cl.
Prereq.: 610 or 611.
A study of the factors involved in the elimination of defective products. Williams.

730 (844) U G 3
Thermodynamics of Alloys
A. 3 cl.
Prereq.: 530 or equiv.
Thermodynamics of liquid and solid alloy systems; numerous problems. St. Pierre.

735 (731) U G 3
Advanced Corrosion
W. 3 cl.
Prereq.: 635.
Theories and mechanisms of corrosion. Staehle.

736 U G 3
The Behavior of Materials at Elevated Temperatures
Sp. 3 cl.
Prereq.: 530 or permission of instructor.
Treatment of the thermodynamic, kinetic, and morphological aspects of the reactions of pure metals and alloys with oxidizing environments at elevated temperatures; the mechanical properties of materials at elevated temperatures. Rupp.

740 (770) U G 3
Theory and Properties of Metals
Sp. 3 cl.
Prereq.: 552, Chem. 533, and Math. 255, or permission of instructor.
Dependence of physical properties on structure; regularities in the structure of alloy systems; stability of alloy system; transplant phenomena in metals and alloys; magnetic phenomena. Speiser.
Advanced Physical Metallurgy I
W. 3 cl.
Prereq.: 552.
Diffusion in metals. Powell.

Advanced Physical Metallurgy II
A. 3 cl.
Prereq.: 552.
Detailed discussion of nucleation theory, preparation of single crystals, metallic crystals and grains, interpretation of microstructure in terms of interfacial tensions, grain growth, and alloying. Meyrick.

Theoretical Metallurgy
A. 3 cl.
Prereq.: Met. E. grad. standing or permission of instructor.
Repeatable to a maximum of 9 cl. hrs.
Current topics in the field of specialization of the visiting Battelle professor of Metallurgy.

Theoretical Metallurgy
W. 3 cl.
Prereq.: 800.
Continuation of 800.

Theoretical Metallurgy
Sp. 3 cl.
Prereq.: 801.
Continuation of 801.

Physical Chemistry of Process Metallurgy
Sp. 3 cl.
Prereq.: 620 and 730.

Advanced Metallurgical Thermodynamics II
W. 3 cl.
Prereq.: 730.
Continuation of 730; thermodynamics of metallurgical systems. Speiser.

Advanced Metallurgical Thermodynamics III
Sp. 3 cl.
Prereq.: 831.
Continuation of 831; irreversible phenomena; metallurgical kinetics; application of rate theory to transport phenomena in metals and to metallurgical reactions. Rapp.

Point Defects in Crystalline Materials
W. 3 cl.
Prereq.: 530 and 635 or equiv., or permission of instructor.
A thermodynamic and electrochemical treatment of the formation, concentrations, mobilities, and interactions of ionic and electronic point defects in ionic compounds at high temperatures. Rapp.

Theory and Properties of Metals
A. 3 cl.
Prereq.: 740.
Continuation of 740. Speiser.

Theory and Properties of Metals
W. 3 cl.
Prereq.: 841.
Continuation of 841. Speiser.

Advanced Physical Metallurgy III
Sp. 3 cl.
Prereq.: 745 and 750.
Classification of phase transformations, precipitation from solid solution, martensitic transformations, decomposition of austenite, and order-disorder. Meyrick.

Advanced Physical Metallurgy IV
A. 3 cl.
Prereq.: 851.
Relation of properties to microstructure. Hirth.

Structures of Metals and Alloys
W. 3 cl.
Prereq.: 550, 552, Math. 255, and Chem. 553; or permission of instructor.
Application of X-ray diffraction and electron diffraction theory to the study of the structure of metals and alloys; discussion of phase diagrams of alloys by X-ray methods; determination of pole figures and orientation. Rigney.

Quantitative Dislocation Theory
W. 3 cl.
Prereq.: Math. 255 or permission of instructor.
881 (801) G 1  
Graduate Seminar  
Prereq.: Met. E. grad. standing.  
Repeatable to a maximum of 6 cr. hrs.  
Discussion of current thesis problems and outstanding current literature in metallurgical engineering; round table discussion of selected metallurgical topics.

884 (901) G 2  
Advanced Topics in Metallurgical Engineering  
Su, A, W, Sp. 2 cr.  
Prereq.: Permission of instructor.  
Repeatable to a maximum of 8 cr. hrs.  
Pertinent topics to be announced.

993 (950) G Arr.  
Research in Metallurgy  
Research for thesis or dissertation purposes only.

Microbiology
Office: Graduate Research Center for Biological Sciences, 684 W. 12th Avenue  
Professors Dodd (Chairman), Banwart, Birkeland (Emeritus), Bohi, Ferguson, Hudson (Emeritus), Macpherson, Randles, Rheins, Rosen, Saslaw, Shull, Stahly (Emeritus), Wallace, Wilson, and Woolpert (Emeritus); Associate Professors Byers, Chorpenning, Dougal, Dugan, Frea, Krieger, Miller, Parrish, Pister, Sinsheimer, and Wolfe; Adjunct Associate Professors Dilley, Lamborg, Mollenhauer, and Reporter: Assistant Professors Kolodzie, Sharp, St. Pierre, and Wise; Instructors Ackermann, Mote, and Troendly.  
For related courses see Biology.

211† (511) U 5  
General Microbiology  
A. 3 cr., 6 lab. hrs.  
Prereq.: Superior performance in biol., chem., and math. in high school and permission of instructor.  
A special course for first year college students; morphologic and physiologic characteristics of microorganisms. Frea, Kolodzie, and Pister. Fee.

212† (512) U 5  
General Microbiology  
W. 3 cr., 6 lab. hrs.  
Prereq.: Superior performance in biol., chem., and math. in high school and permission of instructor.  
A special course for first year college students; genetics and ecology of microorganisms. Frea, Dugan, and Randles. Fee.
625 U G 5
Pathogenesis and Immunology of Infectious Diseases
A. Sp. 3 cl., 2 2-hr. labs.
Prereq.: 622.
A consideration of the microbial and immunological aspects of representative types of infectious diseases. Banwart. Fee.

636 U G 5
Food and Dairy Microbiology
Sp. 3 cl., 3 2-hr. labs.
Prereq.: 609.
The role of microorganisms in normal and abnormal fermentation in foods and dairy products; related sanitation and public health problems. Banwart. Fee.

639* U G 4
Aquatic Microbiology
Su (1st term). 3 all-day cl. per wk.
Prereq.: 20 cr. hrs. of biological science, including Microbiol. 607 or equiv., and Chem. 231 or equiv.
Given only at the Franz Theodore Stone Laboratory.
The nature and activities of bacteria in the aquatic environment, with emphasis on the different physiological types found in the Lake Erie region. Randies.

652 P G 6
General and Pathogenic Microbiology for Dental Students
W. 4 cl., 3 2-hr. lab.
Prereq.: Dent. 2nd yr. standing.
A survey of the techniques and principles of microbiology and immunology with special reference to the microbiology of the oral cavity. Rosen and Chorpenning.

Seal Microbiology
(See Agron. 640.)

653 (701) U G 1-5
Individual Studies in Microbiology
Prereq.: Microbiol. 4th yr. major or grad. standing and permission of instructor.
No more than 5 cr. hrs. can be counted toward an undergraduate microbiol. major.
Repeatable only by undergraduates to a maximum of 15 cr. hrs.
Outlined by instructor to meet individual student's needs.

694 U G 2-5
Croup Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Group work on special topics in microbial or cellular biology.

710† U G 3
History of Microbiology and Allied Fields
Sp., Lec., cons., and library work.
Prereq.: Microbiol. advanced graduate standing and permission of instructor.
The historical development of bacteriology, immunology, and allied fields.

723 U G 5
Immunology and Immunochernistry
A. 3 cl., 2 3-hr. labs.
Prereq.: 622 and permission of instructor.
A thorough treatment of the basic phenomena involving antigens and antibodies, their physiological natures, and immunological reactions. Chorpenning. Fee.

725 U G 5
Bacterial Pathogens
A. 3 cl., 2 2-hr. labs.
Prereq.: 625 and permission of instructor.

729 (620) U G 3
Pathogenic Protozoology
W. 3 cl.
Prereq.: 625.
Various pathogenic protozoa of animals; host-parasite relationships; pathogenesis of protozoa diseases; structural characteristics of parasites. Kreier.

734 U G 5
Water Microbiology
W. 2 cl., 2 2-hr. labs.
Prereq.: 609 and permission of instructor.
A basic study of the relationships and influence of aquatic environments on microorganisms and the effect of microbial metabolic processes on the quality of water. Dugan. Fee.

736* U G 5
Advanced Food Microbiology
A. 2 cl., 2 3-hr. labs.
Prereq.: 636 and permission of instructor.
Advanced studies in the metabolism of microorganisms involved in preservation and food processing using radioisotopes, chromatography, and electrophoresis. Banwart. Fee.

749 U G 5
Basic Virology
W. 3 cl., 2 3-hr. labs.
Prereq.: 609 and Biochem. or Physiol. Chem. and permission of instructor.
The basic physical, chemical, and biological properties of animal and bacterial viruses including intracellular replication and subcellular responses to virus infection. Wolf. Fee.

760 (635) U G 5
Physiology of Bacteria
W. 3 cl., 2 3-hr. labs.
Prereq.: 609.
Nutritional requirements of bacteria, mechanisms of anaerobic dissimilation of carbon compounds, and industrial fermentation. Frey, Kondzalewski, and Randels. Fee.

761† (638) U G 5
Physiology of Bacteria
Sp. 3 cl., 2 3-hr. labs.
Prereq.: 760.
Bacterial enzymes, mechanisms and energy relationships in respiration, nitrogen metabolism, and bacterial synthesis. Dugan, Fee, and Randels. Fee.
Applied Microbiology
A. 3 cl., 2 3-hr. labs.
Pre.: 671 and permission of instructor.
A study of the metabolic activities of microorganisms
exploited to produce useful chemical reactions or
commercial products. Fee.

Microbial Cytology
Sp. 3 cl., 2 3-hr. labs.
Pre.: 609 and permission of instructor.
A thorough study of morphology, fine structure and
composition of microorganisms, and the relation of
these to cell function. Pfister. Fee.

Protozoan Growth and Reproduction
W. 2 1½-hr. cl.
Pre.: Biol. 640 or 312, Biochem. 511 or equiv., and
permission of instructor.
A consideration of factors regulating the growth and
multiplication of selected protozoans with emphasis on
the roles of environment and genome and on molecular
mechanisms. Byers.

Microbial Genetics
Sp. 3 cl., 2 3-hr. labs.
Pre.: 609 and permission of instructor.
A thorough study of microbial genetics with emphasis
on bacteria and viruses. Fee.

Special Groups of Microorganisms
Sp. 3 cl., 2 3-hr. labs.
Pre.: 609 and permission of instructor.
A study of the morphology, physiology, and ecology of
"non-typical" bacteria, actinomyces, myxobacteriales,
spirochaetes, filamentous S bacteria, and others. Fee.

Advanced Virology
Sp. 2 cl., 2 3-hr. labs.
Pre.: 749 and permission of instructor.
Laboratory study of viruses and some of the virus
diseases of animals and man; methods of isolation,
propagation, identification, diagnosis, and control are
considered. Wolff. Fee.

Advanced Immunology
Sp.
Pre.: 625 and permission of instructor.
Advanced studies of immunological phenomena, with
emphasis on the physical and chemical aspects of
antigens and antibodies. Dodd.

Isosantigens of Man and Animals
Sp. 3 cl., 2 2-hr. labs.
Pre.: 723 or equiv. and permission of instructor.
Advanced genetic, chemical, and immunological studies
of isosantigens, including those in erythrocytes,
leukocytes, platelets, body fluids, and tissues;
implications in transplantation and immunological
diseases. Churoppening. Fee.

Advanced Topics in Bacterial Physiology
A. 3 cl., 2 3-hr. labs.
Pre.: 759 and permission of instructor.
Laboratory study of bacterial physiology by a variety of
techniques. Dugan, Frea, and Randles. Fee.

Seminar in Microbiology
Repeatable by permission of instructor only.

Interdepartmental Seminar in Polar and Alpine Studies
Sp.
(See under Interdepartmental Seminars.)

Interdepartmental Seminar in Natural Resources
Repeatable to a maximum of 9 cr. hrs. with permission
of the dept. of enrollment.
(See under Interdepartmental Seminars)

Interdepartmental Seminar in Nutrition and Food Technology
Sp.
(See under Interdepartmental Seminars)

Group Studies
Pre.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Group work on special topics in microbial or cellular
biology.

Research in Microbiology
Research for thesis or dissertation purposes only.

Military Science
Office: 263 Military Science Building, 2211 Tuttle Park
Place.

Army Reserve Officers Training Corps.
Colonel Horton and Staff.

Basic Military Science

American Military History
A, W. 1 2-hr. cl., 1 hr. leadership lab.
An introduction to the Army and the ROTC; American
military history from 1607 through 1865; leadership
laboratory.
American Military History
W, Sp. 1 2-hr. cl., 1 hr. leadership lab.
Prereq.: 101 or permission of Professor of Mil. Sc.
American military history from 1865 through 1953; leadership laboratory.

Individual Weapons and Marksmanship
Su, A, W, Sp. 1 2-hr. cl., 1 hr. leadership lab.
Fundamentals of small arms operation; small-bore rifle marksmanship; leadership laboratory.

Map and Aerial Photograph Reading
Su, A. 2 1-hr. cl., 1 hr. leadership lab.
Prereq.: 101, 102, 103 or equiv.
Application of basic principles of map reading, emphasizing terrain evaluation, including map symbols, military grid system, and elementary aerial photograph reading; leadership laboratory.

United States Army and National Security
Su, W. 2 1-hr. cl., 1 hr. leadership lab.
Prereq.: 201 or permission of Professor of Mil. Sc.
Role of the United States Army in national security; leadership laboratory.

Introduction to Operations and Basic Tactics
Su, Sp. 2 1-hr. cl., 1 hr. leadership lab.
Prereq.: 202 or permission of Professor of Mil. Sc.
Mission, organization, and composition of the infantry rifle squad; combat formations, patrolling; field fortifications and camouflage; principles of offensive and defensive combat; leadership laboratory.

Military Leadership, Communication, Internal Defense and Development, and Combat Branches of the Army
A. 2 2-hr. cl., 1 hr. leadership lab.
Prereq.: 101 through 203 or equiv.
Study of psychological and sociological factors affecting human behavior; introduction to communication systems and internal defense and development; familiarization with the combat branches of the Army; leadership laboratory.

Small Unit Tactics
Su, W. 2 2-hr. cl., 1 hr. leadership lab.
Prereq.: 301 or permission of Professor of Mil. Sc.
Study of small unit organization and tactics to include estimates and orders during attack, defense, and retrograde operations; leadership laboratory.

Branches of the Army, Military Teaching Principles, and Pre-Summer Camp Orientation
Sp. 2 2-hr. cl., 1 hr. leadership lab.
Prereq.: 302 or permission of Professor of Mil. Sc.
Familiarization with the service branches of the Army; study of the techniques fundamental to military instruction; familiarization with policies, procedures, and training at summer camp; leadership laboratory.

Military Operations
Su, A. 2 2-hr. cl., 1 hr. leadership lab.
Prereq.: 303 or permission of Professor of Mil. Sc.
The concept of Army combat and combat support organizations; study of organization and operations to include managerial aspects of command and staff; leadership laboratory.

Logistics and Administration
W. 2 2-hr. cl., 1 hr. leadership lab.
Prereq.: 401 or permission of Professor of Mil. Sc.
Study of logistics, training management, and Army administration; leadership laboratory.

Military Justice, Internal Defense and Development of Far East Nations, Map Reading, and Service Orientation
Sp. 2 2-hr. cl., 1 hr. leadership lab.
Prereq.: 402 or permission of Professor of Mil. Sc.
Study of military justice; review of map reading; counter-insurgency warfare; internal defense and development of Far East nations; service orientation; leadership laboratory.

Mineralogy
Office: 291 Watts Hall, 104 West 19th Avenue

Professors: Foster (Chairman), Ehlers, McConnell, McAlachlan, and Wenden; Associate Professor Tetenhorst.

Principles of Mineralogy
A, W, Sp. 3 2-hr. lab.
Prereq.: Chem. 112 or 122, Math. 111 or 150.
Not open to students with credit for 411, 412, or 421.
An introductory course, emphasizing principles and illustrating the internal structure of solids and relationship of structure and chemical composition to properties, applications, and external features. Tetenhorst.

Elementary Mineralogy and Crystallography
A, W. 3 2-hr. lab.
Prereq.: Chem. 112 or 122.
Not open to students with credit for 414.
Crystal systems, symmetry, common forms and cleavage of crystals; chemical bonding and mineral structures; selected phase diagrams; identification of about 40 common minerals using physical and chemical properties. Wenden.
422 U 3
Elementary Optical Mineralogy
W. Sp. 3 2-hr. lab.
Prereq.: 421.
Elements of optical mineralogy; mineral properties in plane and cross-polarized light; mineral identification in powders and thin-sections; X-ray diffraction in mineral identification and mineral-mixture analysis. Wenden.

605 U G 5
Thermochemical Mineralogy
A. 5 cr. hrs.
Prereq.: Chem. 533 or equiv., or permission of instructor.
Thermal properties of minerals; application of high temperature equilibrium to problems of petrology and technology, using phase diagrams. Foster.

621 U G 5
Microscopic Mineralogy
A. W., T. 2 cr., 3 2-hr. lab.
Prereqs.: 414 or 422, and Physics 112 or equiv.
A. open only to Geol. graduates; W. open only to Cer. E. majors.
Not open to students with credit for (625).
Theory and use of polarizing microscope; determination of optical constants and identity of minerals. Ehlers.
A. Emphasis on mineral powders.
W. Emphasis on powders and thin-sections of minerals and synthetic products.

624 (611) U G 3
Microscopy of Opaque Minerals
Sp. 3 2-hr. lab.
Prereq.: 621 or equiv.
Application of the petrographic microscope to the study of opaque minerals and ores, their identification, textures, and paragenesis; polished section preparation, etch tests, and micro-chemical tests. Wenden.

645 (601) U G 5
Advanced Crystallography
A. 3 cr., 2 2-hr. lab.
Prereqs.: 414, 421, or equiv.
Principles of crystallography; morphology, structure and habit in crystals; twinning; two-circle goniometer measurement and drawing of crystals; crystallographic calculations; investigations with precession X-ray camera. Wenden.

648 U G 5
Advanced Mineralogy
W. 3 cr., 2 2-hr. lab.
Prereqs.: 414, 421, or equiv.
Mineral stoichiometry and calculations; application of instrumental methods to mineral identification and the study of mineral suites from selected localities; physical and chemical properties, and paragenesis of minerals on crystal chemical principles. Wenden.

650 U G 5
X-ray Powder Diffraction
W. 3 cr., 2 3-hr. lab.
Prereq.: 414 and Math. 153.
Emphasis on diffractometry; evaluation of instrumental, geometrical, and other factors affecting intensity and position of diffraction maxima; qualitative and quantitative analysis, particle-size and other applications. Tetenhorst.

654 (754) U G 5
X-Ray Crystallography
Sp. 3 cr., 2 3-hr. lab.
Prereq.: 414, 421, or equiv.
Not open to students with credit for Chem. 654.
Principles of X-ray crystal analysis; phase identification by powder film and diffractometer methods; X-ray fluorescent analysis; particle size determination; unit cell and space group by rotation and Weissenberg methods. Wenden.

665 (755) U G 3
Crystallochemical Mineralogy
W. 3 cr.
Prereq.: 414, 421, or permission of instructor.
Application of crystal chemical principles to study of major structure types, to properties, stability and occurrence of minerals, and to problems of polymorphism, solid solution, and crystal growth. Wenden.

706 U G 3
Advanced Thermochemical Mineralogy
W. 3 cr.
Prereq.: 605.
Derivation and interpretation of phase diagrams of ternary and quaternary systems of importance in petrology and technology. Foster.

722 U G 5
Igneous Petrology
W. 3 cr., 2 2-hr. lab.
Prereq.: 422 and Geol. 203 and permission of instructor, or 621.
Petrography, petrogenesis, and occurrence of igneous rocks, with special emphasis on phase equilibria: macroscopic and microscopic examination of igneous and petrographic suites in the laboratory. Ehlers and Shultz.

730 U G 3
Clay Mineralogy
Sp. 3 cr., conf.
Prereq.: 650 or permission of instructor.
Relationship of structure and chemical composition of clay minerals to properties, origin, occurrence, and applications; evaluation of X-ray, differential thermal, infrared, and electron microscope data. Tetenhorst.

784 (701) U G 3-5
Mineralogical Investigations
A. W., Sp. 6-10 cr. hrs. lab. and conf.
Prereq.: Satisfactory courses in field of problem, and permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Special problems in petrological, thermochemical, crystallochemical, X-ray or clay mineralogy, history of mineralogy, or other advanced non-thesis research.
807*  G 3
Hydrothermal Mineralogy
Sp. 3 cl.
Prereq.: 722 and Chem. 531, 532, and 533; or equiv.
The effect of water under various pressure and
temperature conditions related to magmatic and
experimental conditions; mineral synthesis, stability,
and growth of single crystals in hydrothermal
environments. Ehlers.

808*  G 3
High Pressure Mineralogy
Sp. 3 cl.
Prereq.: 722 and Chem. 531, 532, and 533; or equiv.
The general approach of high pressure techniques to
synthesis and stability of inorganic mineral compounds
in both geological and experimental environments;
stability of minerals within the earth's crust and mantle
with technological applications. Ehlers.

823  (725) G 3
Advanced Optical Mineralogy
A. 3 2-hr. lab.
Prereq.: 722 or equiv.
Theory and determination of optical constants and
directional features using Universal Stage; includes
determination of optic angles, feldspar compositions,
double variation technique, and petrofabric analysis.
Ehlers.

831  G 3
Advanced Clay Mineralogy
A. 3 cl., lec., labs., and confs.
Prereq.: 730.
Advanced topics including one-dimensional structure
plots, two-dimensional diffraction effects, and relation
of structure and composition; individual problems;
evaluation of current investigations. Tetenhorst.

858  G 3
Advanced Mineral Structures
Sp. 3 cl.
Prereq.: 665 and Chem. 675.
Review of methods of crystal structure determination by
optical, physical, and X-ray methods; selected examples
from each mineral class; computations illustrated with
laboratory data. McLachlan.

875  G 3
Crystal Growth
A. 3 cl., confs.
Prereq.: 706, Chem 533 and 675, and Math. 255.
A survey of the known methods of growing crystals
coupled with the theory of the kinetic principles
involved in growth, nucleation, and habits of growth.
McLachlan.

876  G 3
Crystal Physics
W. 3 cl.
Prereq.: Chem. 675, Physics 521, and Math. 571.
An introduction to the use of tensors in the description of
the gross physical properties of crystals. McLachlan.

881  (801) G 1-3
Seminar in Mineralogy
A, W, Sp. 2-6 hr. conf.
Reveals to a maximum of 12 cr. hrs.
Conference and reports on the developments in
mineralogical research and their application to the
problems of mineralogy and mineral technology.

999  (950) G Arr.
Research in Mineralogy and Petrography
Research for thesis or dissertation purposes only.

Music
Office: 105 Hughes Hall, 1899 North College Road

Associate Professor Luce (Director); Professors Barnes,
Evans, Geffel, Gilliland, Hadad, Hardstly, Heid, Hoppin,
Kuehlehus, Livingston, Main, McBride, McGinnis,
Phelps, Rigby, Spohn, Staiger, Teller-Kardos, and
Toht; Associate Professors Barnes, Cady, Cooper,
Hickfang, McClure, Mixter, Mooney, Mushchick, Poland,
Ramsey, Rast, Sexton, Sudendorf, Titus, Vedder,
Whitesides, and Wilson; Assistant Professors
Amarandos, Baker, Bonney, Casey, Costanza, Culver,
Hightshoe, Huff, Kates, Levey, Maas, Mesker, Neely,
Pellegrino, Simmons, Whallon, and Wink; Instructors
Bateman, Brodie, Epley, Gano, Green, Hurn, Jones,
LeBlanc, Lord, McDonald, Moore, Platt, Sentier, Swank,
Von Gruenigen, and Zimmerman.

Preceding the class sessions of Music 221 and Music
201, placement tests will be given to determine
the ability of students in these subjects. (See School of
Music for details of time and place.)

100  (400 R) U 1
Concert Attendance
A, W, Sp. Attendance at 9 concerts or recitals.
Prereq.: Attendance at 43 concerts and recitals.

141  (404) U 3
Introduction to Music
Su, A, W, Sp. 3 cl.
Not for credit to Mus. majors.
A musical background is not required.
A consideration of the materials of music and
important styles, forms, and composers from the
Baroque to the present. Gano. Fee.

142  (451) U 3
Introduction to the History of Western Music I
A, W, Sp. 3 cl.
Prereq.: 141.
Not for credit to Mus. majors.
An historical survey of music from classical antiquity
to about 1750. Fee.
143 (452) U 3
Introduction to the History of Western Music II
Su, A, W, Sp. 3 cr.
Prereq.: 141.
Not for credit to Mus. majors.
An historical survey of music from 1750 to the present.
Fee.

CAMPUS MUSIC ORGANIZATIONS
University Campus Music Organizations are open to
all students in the University who may receive full
credit according to regulations of the college in which
they are enrolled.

180 (A 1) U 1
University Chorus
Su (1st term), A, W, Sp. 3 or more hrs. rehearsal each
week.
Prereq.: Admission by audition only.
Oratorio and large choral works are studied and
performed. Casey. Fee.

181 (A 3) U 1
Symphonic Choir
A, W, Sp. 3 or more hrs. rehearsal each week.
Prereq.: Admission by audition only.
Symphonic Choir is a concert organization singing a
variety of literature. Casey. Fee.

182 (A 4) U 1
Women's Glee Club
A, W, Sp. 3 or more hrs. rehearsal each week.
Prereq.: Auditions are held at stated periods, and
vacancies in the club are filled with the best available
voices. Admission by audition and permission of
director.
([Membership in this concert group is open to all
women students in the University by audition.]
Study and performance of choral literature for women's
voices. Simmons. Fee.

183 (A 5) U 1
Men's Glee Club
A, W, Sp. 3 or more hrs. rehearsal each week.
Prereq.: Auditions are held at stated periods, and
vacancies in the club are filled with the best available
voices. Admission by audition and permission of
director.
([Membership in this concert group is open to all
men students in the University by audition only.]
Study and performance of choral literature for men's
voices. Sturges. Fee.

184 (B 1) U 1
University Symphony Orchestra
Su (1st term), A, W, Sp. 3 or more hrs. rehearsal
each week.
Prereq.: Admission by audition and permission of
director.
([Membership is open to all University students and
personnel and to symphony players from in and about
Columbus.]
The University Orchestra is a 75-piece orchestra of
full instrumentation devoted to the preparation of
standard and modern literature; the group gives at
least three concerts each year. Hardesty. Fee.

185 (B 3) U 1
University Little Orchestra
A, W, Sp. 3 or more hrs. rehearsal each week.
Prereq.: Admission by audition.
A selected group giving public and unrecorded
performances; professional orchestral techniques are
emphasized. Gerle. Fee.

186 (C 1) U 1
University Football Marching Band
A, 3 or more hrs. rehearsal each week.
Prereq.: Admission by audition and permission of
director.
Open to men students.
The University Marching Band is a selected group of
120 brass and percussion players which performs at
football games and rallies during Autumn Quarter.
Spohn. Fee.

187 (C 2) U 1
ROTC Band (Air-Army)
W, Sp. 3 or more hrs. rehearsal each week.
Prereq.: Admission by audition and permission of
director.
Open to men students.
Droste. Fee.

188 (D 1) U 1
The University Concert Band
Su (1st term), A, W, Sp. 3 or more hrs. rehearsal each
week.
Prereq.: Admission by audition and permission of
director.
A selected group of limited membership devoted to the
preparation and performance of the best band
literature; gives public concerts and performs for
University functions. McQuinn. Fee.

189 (D 2) U 1
The University Buckeye Band
A, W, Sp. 3 or more hrs. rehearsal each week.
Prereq.: Admission by audition and permission of
director.
Provides concert band participation for students unable
for some reason to play in the University Concert Band;
performs for University functions and gives public
concerts. Evans and Le Blanc. Fee.

190 (F 1) U 1
Opera Chorus
Su (1st term), A, W, Sp. 2 or more hrs. rehearsal each
wk.
Prereq.: Admission by audition and permission of
instructor.
Not open to juniors and seniors in opera program.
Hickfang. Fee.

191 (F 2) U 1
Vocal Ensembles
Su (1st term), A, W, Sp. 2 or more hrs. rehearsal each
week.
Prereq.: Admission by audition and permission of
instructor. Fee.
192 (F 4) U 1
String Ensembles
Su (1st term), A, W, Sp. 2 or more hrs. rehearsal each week.
Prereq.: Admission by audition and permission of instructor. Fee.

193 (F 5) U 1
Woodwind Ensembles
Su (1st term), A, W, Sp. 2 or more hrs. rehearsal each week.
Prereq.: Admission by audition and permission of instructor. Fee.

194 (F 6) U 1
Brass Ensembles
Su (1st term), A, W, Sp. 2 or more hrs. rehearsal each week.
Prereq.: Admission by audition and permission of instructor. Fee.

199 (F 7) U 1
Miscellaneous Ensembles
Su, A, W, Sp. 2 or more hrs. rehearsal each week.
Prereq.: Admission by audition and permission of instructor. Fee.

201 (408) U 1-2
Applied Music
Prereq.: Passing of Placement Test. Required of students in all Music Curricula to a minimum of 6 qtr. hrs.
Open to other qualified students within the limits of instructional facilities by permission of Director of the School of Music.
Instruction in applied music for the purpose of developing musicianship, performance, and a wide reading knowledge of music literature. A brief survey of the history of the instrument and its literature will be made.
Instruction is given in individual lessons for two one-half hour periods each week. In addition, students are required to attend the Studio Classes and Honors Recitals on Tuesday and Thursday at 1:00 p.m. during the 3rd, 5th, 7th, and 10th week of each quarter.

201.01 Piano
Haddad, Neely, Mooney, Whallon, Tetley-Kardos, and Platt.

201.02 Voice
Staiger, Gilliland, Muschick, Whitesides, Cooper, Casey, and Hickfang.

201.03 Strings
Su (1st term), A, W, Sp.
Gerle, Kates, Hardesty, McClure, Culver, and Amorados.

201.04 Woodwinds
Su (1st term), A, W, Sp.
McGinnis, Titus, Green, Baker and Lord.

201.05 Brass
Su (1st term), A, W, Sp.
Evans, Suddendorf, Battenberg, Droste, Le Blanc, and Jones.

201.06 Organ
Held, Wilson, and Riggsby.

201.07 Percussion
Sohn and Moore.

201.08 Harpsichord

201.09 Harp

212 U 2
Diction for Singers (Italian)
A. 3 cl.
Prereq.: Minimum of 6 cr. hrs. of applied study in voice or permission of instructor.
Fundamentals of phonetics and sound production as applied to singing in Italian. Gilliland.

213 U 2
Diction for Singers (German)
W. 3 cl.
Prereq.: Minimum of 6 cr. hrs. of applied study in voice or permission of instructor, and 212.
Fundamentals of phonetics and sound production as applied to singing in German. Cooper.

214 U 2
Diction for Singers (French)
Sp. 3 cl.
Prereq.: Minimum of 6 cr. hrs. of applied voice or permission of instructor, and 212.
Fundamentals of phonetics and sound production as applied to singing in French. Muschick.

221 (401) U 3
Music Theory I
A. W. 3 cl.
Prereq.: Passing of placement tests.
The elements of music: development of analytical, notational and keyboard skills, one- and two-part writing, elementary formal structures, and creative work.

222 (402) U 3
Music Theory II
W, Sp. 3 cl.
Prereq.: 221.
Three- and four-part writing, continuation of analysis, keyboard, formal and chord vocabulary studies, secondary dominants, non-chord tones, and creative work.

223 (403) U 3
Music Theory III
Su, Sp. 3 cl.
Prereq.: 222.
Continuation of creative, analytical and writing skills and extension of musical vocabulary, seventh chords and modulation, and keyboard practice.
224  U 1
Sight Singing and Dictation I
A. W. 3 lab. hrs.
Singing and writing of major and minor scales, intervals, trichords, harmonic groups, tonal melodies, and canons.

225  U 1
Sight Singing and Dictation II
W, Sp. 3 lab. hrs.
Prereq.: 224.
Singing and writing of chromatic scales, seventh-chord outlines, tonal and rhythmic groups, more difficult tonal melodies, and two-part work.

228  U 1
Sight Singing and Dictation III
Su, Sp. 3 lab. hrs.
Prereq.: 225.
Singing and writing of synthetic scales, seventh and ninth chord outlines, tonal melodies with modulations, rhythmic drills, and syncopated figures.

241  (551)  U 3
Music History I
A. 3 cl., 2 lab. hrs.
Prereq.: 223.
The development of music from the earliest times through the sixteenth century. Maas.

242  (552)  U 3
Music History II
W. 3 cl., 2 lab. hrs.
Prereq.: 241.
The development of music in the 17th and 18th centuries. Maas.

243  (553)  U 3
Music History III
Sp. 3 cl., 2 lab. hrs.
Prereq.: 242.
The development of music in the 19th and 20th centuries. Maas.

261  (511)  U 1 or 2
Applied Music Methods and Materials I
261.01 Piano
A, W, Sp. 4 cl.
Rest.
261.02 Voice
A, W, Sp. 4 cl.
Swank.
261.03 Strings
A. 4 cl.
Culver.
261.04 Woodwinds
A. 4 cl.
Von Gruenigen.
261.05 Brass
W. 4 cl.
Evans.
261.07 Percussion
W, Sp. 4 cl.
Moore.

262  (512)  U 2
Applied Music Methods and Materials II
Prereq.: 261 or equiv.
262.01 Piano
A, W, Sp. 4 cl.
262.02 Voice
W, Sp. 4 cl.
262.03 Strings
W. 4 cl.
262.04 Woodwinds
Sp. 4 cl.
262.05 Brass
Sp. 4 cl.

263  U 2
Applied Music Methods and Materials III
Prereq.: 262 or equiv.
263.01 Piano
Sp. 4 cl.
263.02 Voice
Sp. 4 cl.

264  U 2
Applied Music Methods and Materials IV
Prereq.: 263 or equiv.
264.01 Piano
A. 4 cl.
264.02 Voice
A. 4 cl.

265  (514)  U 2
Music for Group Recreation
A, Sp. 3 cl.
Preparation and participation in folk singing and dancing. Experience in group leadership designed for recreation and camp leaders, social workers, teachers of music, and classroom teachers. Sexton.

270  (547)  U 3
Basic Experiences in Music: Fundamentals
Su, A, W, Sp. 5 cl.
Ear-training, music reading, creative writing, voice production, and some instrumental experience as applied to the music program in the elementary school. Sexton. Fee.

271  (546)  U 2
Basic Experiences in Music: Literature and Listening
Su, A, W, Sp. 4 cl.
The elements involved in active, intelligent listening, understanding, and appreciation of representative works of music as applied to the music program in the elementary school. Sexton. Fee.

312  (515)  U 2
Opera Performance
Su (2nd term), A, W, Sp. 4 lab. hrs.
Prereq.: Junior or senior standing and permission of instructor.
Repeatable to a maximum of 10 cr. hrs.
Instruction and experience in preparation for open performance, including study of operatic literature and coaching of operatic roles. Hickfong.
Music for Elementary Teachers
Su, Al W, Sp. 5 cr.
Prereq.: 270, 271, and professional standing.
Music literature and teaching aids for children, including singing, rhythmic, creative, and listening experiences, and their presentation. Sexton, Bonney, McDonald, and Tolbert. Fee.

Applied Music
Prereq.: 201 and permission of applied area faculty.
Open to other qualified students within the limits of instructional facilities by permission of the Director of the School of Music.
Instruction in Applied Music for the purpose of developing musicianship, performance, and a wide reading knowledge of music literature.
Instruction is given in individual lessons of two one-half hour periods each week. In addition, students are required to attend the Studio Classes and Honors Recitals on Tuesday and Thursday at 1:00 p.m. during the 3rd, 5th, 7th, and 10th week of each quarter.

Harmony I
A. 3 cr.
Prereq.: 222.
Seventh chords, common-chord modulation, borrowed tones and borrowed chords.

Harmony II
W. 3 cr.
Prereq.: 421.
Secondary dominants, modulation to remote keys and elementary instrumentation.

Harmony III
Sp. 3 cr.
Prereq.: 422
Chromatic chord forms, chromatic modulation, and composition.

Ear-Training I
A. 4 lab. hrs.
Prereq.: 222.
Sight-singing, dictation, and keyboard harmony.

Ear-Training II
W. 4 lab. hrs.
Prereq.: 424 and 421.
Intermediate sight-singing, dictation, and keyboard harmony.

Ear-Training III
Sp. 4 lab. hrs.
Prereq.: 425 and 422.
Advanced sight-singing, dictation, and keyboard harmony.

Keyboard Harmony I
A. 2 cr.
Prereq.: 261.01, 262.01, and 263.01 (6 cr. hrs), 261.01 (6 cr. hrs.), or equiv.
Systematic review and utilization of basic harmonic materials at the keyboard.

Keyboard Harmony II
W. 2 cr.
Prereq.: 427.
An introduction to score reading at the keyboard.

Keyboard Harmony III
Sp. 2 cr.
Prereq.: 428.
Score reading at the keyboard.
501.05 Brass
Su (1st term), A, W, Sp.

501.06 Organ

501.07 Percussion

501.08 Harpsichord

501.09 Harp

521 (530) U 3
Form and Analysis
Su, A. 3 cl.
Prereq.: 423.
Introduction to the study of the formal structure of music.

524 (532) U 3
Instrumentation
W, Sp. 3 cl.
Prereq.: 423.
An elementary course in scoring for the instruments of the orchestra and the band. McClure.

531 (562) U 3
Counterpoint
A. 3 cl.
Prereq.: 423.
A fundamental course in counterpoint including species counterpoint, double counterpoint, imitation, and two-voice canon. Barnes and Wilson.

535 (581) U 3
Composition
W, Sp. 3 cl.
Prereq.: 423.
Creative writing in the small forms.

560 (540) U 3
Beginning Conducting
A, W. 3 cl.
Prereq.: 423.
The basic technique of the baton; a syllabus of selected literature and reading assignments will be used as a basis for study. McGinnis and Casey.

561 (522) U 5
General Music in the Elementary School
A, Sp. 4 cl., 2 lab. hrs.
Prereq.: Professional standing.
Study of music literature, teaching methods, and the role of the music teacher in developing general music programs in the elementary schools. Bonney, Sexton, and Tolbert.

562 (523) U 3
General Music in the Secondary School
A, Sp. 2 cl., 2 lab. hrs.
Prereq.: Professional standing.
Study of teaching practices and music literature suitable for general music classes in the secondary schools. Ramsey, McDonald, and Tolbert.

563 (541) U 5
Instrumental Music in the Schools
A, W. 4 cl., 2 lab. hrs.
Prereq.: Professional standing.
The role of instrumental music in public education, techniques of teaching instrumental music, and materials appropriate to the needs of elementary and secondary school students. Meeker and Von Gruenigen.

564 (524) U 3
Choral Music in the Secondary School
W, Sp. 2 cl., 2 lab. hrs.
Prereq.: Professional standing.
Fundamentals of teaching choral music and materials appropriate to the choral music program in the secondary school. Epley.

593 (650) U G 1-5
Individual Studies
Prereq.: Permission of instructor.
Individual studies in specified problems in the field of music.

594 U 1-5
Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 9 cr. hrs.
Supervised group studies of special problems.

601 U 1, 2, or 4
Applied Music
Prereq.: 501 and permission of applied area faculty.
Open to other qualified students within the limits of instructional facilities by permission of Director of School of Music.
Performance in applied music at the professional level. Instruction in applied music for the purpose of developing musicianship, performance, and a wide reading knowledge of music literature.
Instruction is given in individual lessons of two one-half hour periods each week. In addition, students are required to attend the Studio Classes and Honors Recitals on Tuesday and Thursday at 1:10 p.m. during the 3rd, 5th, 7th, and 10th week of each quarter.

601.01 Piano

601.02 Voice

601.03 Strings
Su (1st term), A, W, Sp.

601.04 Woodwinds
Su (1st term), A, W, Sp.

601.05 Brass
Su (1st term), A, W, Sp.

601.06 Organ

601.07 Percussion

601.08 Harpsichord

601.09 Harp
Graduating Recital
Prereq.: 501. 12 cr. hrs.
Special preparation for the presentation of the
applied music graduating recital for the Bachelor of
Music degree.

Analysis: The Classic Period
Su, W. 3 cl.
Prereq.: 521 or 243.
An analytical study of representative works from
Classic literature.

Analysis: The Romantic Period
Su, W. 3 cl.
Prereq.: 521 or 243.
An analytical study of representative works from
Romantic literature. Barnes and Vedder.

Band Scoring
Su. 3 cl.
Prereq.: 524.
Scoring for the concert band. Barnes.

Orchestra Scoring
A. 3 cl.
Prereq.: 524.
Scoring for the orchestra. Barnes.

Advanced Keyboard Harmony
W. 3 cl.
Prereq.: 523.
Practice in harmonizing melodies, realizing figured
bass, improvisation, and modulation at the keyboard.

Counterpoint I
Su, W. 3 cl.
Prereq.: 531.
Studies in imitation and invertible counterpoint,
applied in the writing of two-and-three-part
inventions.

Counterpoint II
A. 3 cl.
Prereq.: 631.
Writing of chorale preludes, trio sonata movements,
and fugal expositions.

Gregorian Chant
A. 3 cl.
A study of the historical background and
characteristics of plain-song, including the technical
aspects of notation, modes, rhythm, and chironomy.
Kuehlethuhs.

Modal Counterpoint I
W. 3 cl.
Prereq.: 521 and 243.
Counterpoint based on the vocal polyphonic style
of the 16th century; analysis of representative works
and practice in motet writing. Kuehlethuhs.

Composition
Su, A, W, Sp. 3 cl.
Prereq.: 535.
Repeatability to a maximum of 9 cr. hrs.
Creative writing, analysis, discussion, and
employment of devices used in contemporary music.
Barnes, Huff, and Levey.

Music in the Middle Ages
A. 3 cl.
Prereq.: 521 or 531, and 243.
The development of western music through the
14th century.

Music in the Renaissance
W. 3 cl.
Prereq.: 521 or 531 or 243.
The development of musical styles from Dufay
through Palestrina and Lassus.

Music in the Baroque Period
Sp. 3 cl.
Prereq.: 521 or 531, and 243.
The development of musical styles from Monteverdi
through Bach.

Music in the Classic Period
Su. 3 cl.
Prereq.: 521 or 531, and 243.
Vocal and instrumental music of the middle and
late 18th century.

Music in the Romantic Period
W. 3 cl.
Prereq.: 521 or 531, and 243.
The music of the Romantic period in Germany and
France.

Modern Music
Su. 3 cl.
Prereq.: 521 or 531, and 243.
Major trends in the development of music since 1900.

The History of Music in the United States
Sp. 3 cl.
Prereq.: Junior or senior standing.
A survey of music in the United States from colonial
times until the present.
647 (617) U G 3
Individual Composers: Their Lives and Works
W. 3 cl.
Prereq: 521 or 531, and 243.
A comprehensive study of the works of an individual composer; topic varies from year to year.

648* (615) U G 3
Chamber Music Literature
A. 3 cl.
Prereq.: 521 or 531, and 243.
A survey of chamber music of the Classic and Romantic periods.

649* (616) U G 3
Symphonic Literature
Su. 3 cl.
Prereq.: 521 or 531, and 243.
A survey of orchestral music from the Classic period to the present. Mixter.

650* (614) U G 3
Choral Literature
A. 3 cl.
Prereq.: 521 or 531, and 243.
A survey of choral music from the Renaissance to the present.

651* (602) U G 3
Opera Literature
Sp. 3 cl.
Prereq.: 521 or 531, and 243.
A survey of the antecedents of opera and a study of representative works from each of the major periods in the history of opera.

652 (717) U G 3
Song Literature
Su (1st term), Sp. 3 cl.
The study of song literature including historical and philosophical backgrounds selected to meet the needs of the student, artist, or teacher; program building. Gilliland.

653* (610) U G 3
Piano Literature
Su (1st term), Sp. 3 cl.
Prereq.: 521 or 531, and 243.
A study of the piano sonata and other characteristic forms from the pre-piano period to the present time. Haddad and Tetley-Kardos.

654* (604) U G 3
Organ Literature
Sp. 3 cl.
Prereq.: 521 or 531, and 243.
A comprehensive survey from the earliest compositions to the works of present-day composers. Held.

660 (643) U G 3
Advanced Conducting (Instrumental)
Su (1st term), Sp. 3 cl.
Prereq.: 521 and 560.
An attempt to develop the power to interpret the larger forms of instrumental literature and to read from full score. McGinnis.

661 (646) U G 3
Advanced Conducting (Vocal)
Su (2nd term), Sp. 3 cl.
Prereq.: 521 and 560.
Development of power to interpret the larger forms of choral literature and to read from full score. Casey.

660 (650 Z) U G 2
Collegium Musicum
Study and performance of music from the Medieval, Renaissance, and Baroque periods; practical study of early music instruments. Maas.

661 (670) U G 3
Liturgies
W. 3 cl.
Historic liturgies of the church as a background for the work of the church musician; contemporary movements in liturgical practice. Held.

662 (672) U G 3
Hymnology
A. 3 cl.
Prereq.: 423 or permission of instructor.
An historical survey of Christian hymnody; consideration of criteria for judging texts and tunes with regard to artistic quality and liturgical suitability. Held.

663 (671) U G 3
Techniques and Materials for Church Choirs
Sp. 3 cl.
A study of anthem materials, chants and proper, with consideration of programming and performance. Held.

664 (576) U 2
Field Experience in Church Music
Prereq.: 560 and 683, or concur. 683.
Supervised experience in the actual church situation. Held.

693 U G 1-5
Individual Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Individual studies in specified problems in the field of music.

694 U G 1-5
Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Supervised group study of special problems in the field of music.
711 (719) U G 3
Theory Pedagogy
Su. 5 cl.
Prereq.: Mus. 4th yr. standing.
The teaching of music theory in colleges and secondary schools.

786 (620) U G 3
Introduction to Bibliographic Method
Su, A. 3 cl.
Prereq.: 521 or 531, and 243.
The collection, examination, and documentation of information about music, including general as well as music library materials. Mixter.

780 (747) U G 1-5
Problems in Vocal Music Education
Prereq.: Permission of instructor.
Repeatable to a maximum of 10 cr. hrs.
Study of problems encountered in the teaching and supervising of vocal music.

791 (749) U G 1-5
Problems in Instrumental Music Education
Prereq.: Permission of instructor.
Repeatable to a maximum of 10 cr. hrs.
Study of problems encountered in teaching, supervising, and organization of the instrumental music program.

792 (748) U G 1-5
Choral Problems
Su (1st term), A, W, Sp.
Prereq.: Permission of instructor.
Repeatable to a maximum of 10 cr. hrs.
Study of the problems encountered in developing choruses and church choirs. Casey.

793 U G 1-5
Individual Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Individual studies in specified problems in the field of music.

794 U G 1-5
Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Supervised group studies of special problems in the field of music.

801 (709) G 1, 2, or 4
Applied Music
Instruction is given in individual lessons of two one half-hour periods each week or the equivalent.
Prereq.: Placement exam.
Open to other qualified students within the limits of instructional facilities by permission of Director of School of Music.

A specialized and intense study of applied music literature and the techniques of performance.

801.01 Piano

801.02 Voice

801.03 Strings
Su (1st term), A, W, Sp.

801.04 Woodwinds
Su (1st term), A, W, Sp.

801.05 Brass
Su (1st term), A, W, Sp.

801.06 Organ

801.07 Percussion

801.08 Harpsichord

801.09 Harp

811 (720) G 3
Piano Pedagogy
Su (1st term). 5 cl.
Prereq.: Mus. grad. standing and minimum of 6 cr. hrs. of applied study in piano.
An analysis of the principles and practices current in the teaching of piano. Rast and Haddad.

812 (721) G 3
Vocal Pedagogy
W. 5 cl.
Prereq.: Mus. grad. standing and minimum of 6 cr. hrs. of applied study in voice.
An analysis of the principles and practices current in the teaching of voice.

813†* (722) G 3
String Instrument Pedagogy
Su (1st term). 5 cl.
Prereq.: Mus. grad. standing and minimum of 6 cr. hrs. of applied study in string instruments.
An analysis of the principles and practices current in the teaching of strings. Culver.

814* (723) G 3
Woodwind Instrument Pedagogy
Su (1st term). 5 cl.
Prereq.: Mus. grad. standing and minimum of 6 cr. hrs. of applied study in woodwind instruments.
An analysis of the principles and practices current in the teaching of woodwinds. Titus.

815†* (724) G 3
Brass Instrument Pedagogy
Su (1st term). 5 cl.
Prereq.: Mus. grad. standing and minimum of 6 cr. hrs. of applied study in brass instruments.
An analysis of the principles and practices current in the teaching of brass instruments. Evans.
<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Level</th>
<th>Title</th>
<th>Prerequisites</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>822 (731)</td>
<td>G 3</td>
<td>822</td>
<td>Advanced Analysis: The Romantic Period</td>
<td>W. 3 cl.</td>
<td>Prereq.: 2 of the following courses: 621, 622, or 821. An analytical study of selected major works from the Romantic literature. Poland.</td>
</tr>
<tr>
<td>823 (732)</td>
<td>G 3</td>
<td>823</td>
<td>Advanced Analysis: Post-Romantic to Modern Music</td>
<td>Sp. 3 cl.</td>
<td>Prereq.: 821 or 822. Analysis of selected works reflecting the evolution from the post-romantic period to contemporary styles. Poland.</td>
</tr>
<tr>
<td>827 (751)</td>
<td>G 5</td>
<td>827</td>
<td>Development of Music Theory II</td>
<td>W. 3 cl.</td>
<td>A study of the principal treatises on music theory from 1400 to 1700. Phelps.</td>
</tr>
<tr>
<td>829 (753)</td>
<td>G 3</td>
<td>829</td>
<td>Contemporary Theories of Music</td>
<td>Sp. 3 cl.</td>
<td>Prereq.: Mus. grad. standing. Fundamental concepts of theory construction and experimental verification of contemporary theories of music. Poland.</td>
</tr>
<tr>
<td>831‡ (765)</td>
<td>G 3</td>
<td></td>
<td>Contrapuntal Techniques</td>
<td>Sp. 3 cl.</td>
<td>Prereq.: 631 or 632. Analysis and stylistic writing of canons, invertible counterpoint, and variations.</td>
</tr>
<tr>
<td>832* (766)</td>
<td>G 3</td>
<td></td>
<td>Fugue</td>
<td>Sp. 3 cl.</td>
<td>Prereq.: 632. Detailed study of the fugue; writing of three-voice and four-voice fugues.</td>
</tr>
<tr>
<td>833 (850)</td>
<td>G 3</td>
<td></td>
<td>Contrapuntal Techniques</td>
<td>A.</td>
<td>Prereq.: 621 and 625, or permission of instructor. Contrapuntal techniques in the works of 20th-century composers.</td>
</tr>
<tr>
<td>842*</td>
<td>G 5</td>
<td></td>
<td>Studies in Renaissance Music</td>
<td>Su. 3-5 cl.</td>
<td>Problems and research in music between 1400 and 1600. Mixter.</td>
</tr>
</tbody>
</table>
844* (787) G 5
Studies in Classic Music
A. 3-5 cl.
Problems and research in music of the late 18th century. Livingston.

845* (788) G 5
Studies in Romantic Music
W. 3-5 cl.
Problems and research in music of the 19th century. Livingston.

846* (789) G 5
Studies in Modern Music
Su. Sp. 3-5 cl.
Problems and research in music of the 20th century. Hoppin.

847 (702) G 5
Notation to 1300
A. 3 cl.
Prereq. or concur.: 640.
A study of neumes, the development of staff and square notation, primitive systems, rhythmic modes, Franciscan notation, and the innovations of Petrus de Cruce. Mixter.

848 (703) G 5
Notation of 14th and 15th Centuries
W. 3 cl.
Prereq.: 847.
A study of Ars Nova Notation, Manered Notation, and the transition to white notation. Hoppin.

849 (704) G 5
Notation of the Late 15th and 16th Centuries
Sp. 3 cl.
Prereq.: 848.
The study of proportions, keyboard notations, and lute tablatures. Hoppin.

850* (701) G 5
The History of Performance Practices
Sp. 3 cl.
A study of primary sources pertaining to contemporary attitudes and practices in the performance of music from the Middle Ages to the present. Livingston.

851** (707) G 5
Musical Sources and Historiography
Sp. 3 cl.
Prereq.: 786.
A study of music historiography, supplemented by the examination of musical documents from each of the periods of music history. Mixter.

852 G 3
The Literature of the Piano
Prereq.: Admission to the M.M. curriculum for piano major or permission of instructor.

An intensive survey of the major literature for the piano with attention to forms and performance traditions.

852.01 The Literature of the Piano I
A. 3 cl.

852.11 The Literature of the Piano II
W. 3 cl.

852.21 The Literature of the Piano III
Sp. 3 cl.

860 (621) G 3
Basic Concepts in Music Education
Su (1st term), A, Sp. 3 cl.
Prereq.: Ed. 586 or 587.
The principles of music education and of the educational and cultural objectives derived from related disciplines which give direction and purpose to the music education program. Ramsay and Tolbert.

861 (656) G 3
Principles of Music Learning
Su (1st term), Sp. 3 cl.
Analysis of the learning process in music as related to problems of music instruction to the public school. Costanza.

862* (622) G 3
Principles and Practices in Elementary School Music
Su. 5 cl.
Analysis and appraisal of the music program in elementary schools including the relationship of music to the total school program. Ramsay.

863* (623) G 3
Literature of Elementary School Music
Su (1st term). 3 cl.
A critical study of folk and art music of various cultures and historic periods for the general vocal and listening activities of the integrated curriculum. Tolbert.

864** (624) G 3
Principles and Practices in Vocal Music Education
Su (1st term). 5 cl.
Analysis and appraisal of the organization, purpose, and development of the vocal music program in secondary schools. Simmons.

865** (625) G 3
Literature for Vocal Music Education
Su (2nd term). 5 cl.
A study of vocal literature of various cultures and historic periods for use with choral groups in the secondary music program. Simmons.

866* (626) G 3
Teaching Practices in General Music
Su (2nd term). 3 cl.
Prereq.: Permission of instructor.
Study of current concepts in organizing and teaching general music in the secondary school. Ramsey.
875 (850 I) G 3
Psychological Factors in Music Education
A. 3 cl.
Seminar, Costanza.

876 G 3
Evaluation and Measurement in Music Education
Sp. 3 cl.
Prereq.: Psychol. 608.
Seminar, Costanza.

877 G 3
Social Factors in Music Education
W. 3 cl.
Seminar, Cady.

878 (850 J) G 3
Music Education and the Curriculum
A.
A study of the application of music education in the school curriculum. Cady.

879 (850 K) G 3
Music in Higher Education
Su (1st term), A.
Cady.

881 (850 Q) G 3
Factors in Choral Tone Production
W. 3 cl.
Choral blend and other vocal techniques.

899 G 1-5
Interdepartmental Seminar

993 (890) G 1-5
Individual Studies
Individual research projects not connected with the dissertation.

994 G 3-5
Group Studies
Repeatable to a maximum of 15 cr. hrs.

994.01 (880 B) Seminar in Music Theory
Barnes, Phelps, and Poland.

994.02 (880 C) Seminar in Music Education
Cady.

994.03 (881) Seminar in Music History
Livingston and Hoppin.

999 (950) G Arr.
Research in Music
Research for thesis or dissertation purposes only.
National Security Policy Studies

Office: 199 West Tenth Avenue

Mershon Center for Education in National Security, Richard C. Snyder (Director).

200 U 5
National Security Policy and Policymaking
W.
Survey and policies affecting the security of the United States and of the processes by which such policies are formulated, executed, and appraised.

639 (701) U G 1-5
Individual Studies in National Security Policy
Prereq.: Permission of instructor.
A special national security topic is assigned to each student for reading and a report.

702 U G 3-5
Introduction to National Security
A. 1 cl.
Prereq.: Permission of instructor.
Examination of approaches taken by various social science disciplines to field of national security; survey of literature in field; identification of major problem areas.

785 (703) U G 3-5
Research Principles and Techniques in National Security
W. 1 cl.
Prereq.: 702 or permission of instructor.
Repeatable with permission of instructor to a maximum of 10 cr. hrs.
Examination of particular policy problems and the application thereto of social science analytical techniques.

801 G 3-5
Seminar in National Security Research
Sp. 1 cl.
Prereq.: 702 or permission of instructor.
For advanced graduate students preparing master's theses and doctoral dissertations in the field of national security; formulation and application of social science research designs to specific aspects of national security.

Natural Resources

Office: School of Natural Resources, 246 Lord Hall, 124 West 17th Avenue

Professors Cowen, Diller, Gatherum, Hahn, J. C. Johnson, Kriebel, Schick, Taff, and Touse; Associate Professors Blockhout, Good, Larson, Momoc, Tubb, Vimmerstedt, and Whitmore; Assistant Professors Clark, Roth, Stockdale, and Vogt; Instructors Pierce and Taub.

201 U 3
Introduction to Conservation of Natural Resources
A, Sp. 3 cl., 1 2-day field trip.
Not open to students with credit for Conserv. 201.

202 U 3
Conservation Agencies
W. 3 cl.
Prereq.: 201 or Geog. 530.
Not open to students with credit for Conserv. 202.
History and responsibilities of governmental agencies and some private organizations for natural resources management; representatives of conservation agencies present programs and problems. Johnson.

489 U 3
Field Work in Conservation
Prereq.: 201 or Geog. 530, and permission of instructor.
Not open to students with credit for Conserv. 489.
Repeatable to a maximum of 6 cr. hrs.
The student must secure approval of advisor prior to employment, and submit a final written report.

510 U G 5
Natural History of Ohio
Su, Sp. 3 cl. and arr. field trip.
Cannot be taken concur. with Bot. 410 or Zool. 220.
Geology and soils; vegetation types and regions; major wildlife; field work on ecology, observation techniques, and identification skills. Fee.

610 U G 5
Interpretive Work
Su, Sp. 1 2-hr. cl. and arr. field trips.
Prereq.: Biol. 313 or equiv., Bot. 410 or Forest. 222, Geol. 102, and 5 cr. hrs. Psychol.
Professional course for park naturalists, teachers, and outdoor education workers; history of interpretive work; philosophy and objectives; case studies of programs; interpretive techniques; and evaluation. Johnson. Fee.

611 U G 6
Field Course in Conservation and Outdoor Education
Su (1st term).
Concur.: 694 for 3 cr. hrs., and permission of instructor.
Not open to students with credit for Ed. 691.
Study and field work in natural history, resources management, and conservation and outdoor education. Fee.
620 U G 5
Management of Fisheries
W. 5 cl.
Prereq.: Biol. 313 or equiv.
Not open to students with credit for 600. 660.
Fisheries resource management problems and programs
including biological, economic, and social factors of
local, national, and international importance. Monot.
Fee.

621 U G 5
Principles of Wildlife Management
A. 5 cl.
Prereq.: Biol. 313 or equiv.
Introduction to the social, economic, and biological
principles related to the management and utilization
of wildlife resources. Good. Fee.

622 U G 15
Field Laboratory in Renewable
Natural Resources Management
Sp. Full time of student arr. in the field and
classroom.
Prereq.: 620 or 621, and permission of instructor.
Field experience in identifying and solving problems
in the management of renewable natural resources;
work in a variety of habitats using appropriate tools
and techniques. Good and Monot. Fee.

600 U G 4
Natural Resources Problems,
Programs, and Policies
W. 2-2 hr. cl.
Prereq.: 201 or Geog. 530.
Not open to students with credit for Agr. Econ. 680.
Analytical study of contemporary and future problems
of natural resources conservation and programs and
policies related to their solution. Johnson.

601 U G 4
Interactions in Natural Resources Management
A. 4 cl.
Prereq.: Permission of instructor.
Impact of man's activity on natural resources;
interrelationships between resources and physical and
social environment and prospects for effective
resources management. Roth.

693 U G 2-5
Individual Studies in Natural Resources
Prereq.: Permission of instructor.
Repeatable to a maximum of 10 cr. hrs.

694 U G 2-5
Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 10 cr. hrs. for each
subdivision.
Group studies on the nature and management of
natural resources encompassed in one of the following
areas:
694.01 Conservation and Outdoor Education
694.02 Fisheries and Wildlife
694.03 Forestry and Forest Industries
694.04 Parks and Recreation
694.05 Resource Development and Conservation
694.06 Unclassified

785 U G 4
Research Methods in Natural
Resources Management
W. 4 cl.
Prereq.: Math. 117, 123, or 126; an introductory course
in Statistics, and permission of instructor.
Research design; experimental procedures;
information-gathering tools, including reporting units
for resource-related data; statistical methods; and
procedures for analysis of data.

897 G 1
Interdepartmental Seminar in Natural Resources
(See under Interdepartmental Seminars.)

999 G Arr.
Research
Research for thesis or dissertation purposes only.

Naval Science
Office: 179 Navy Annex, Physical Education Building,
337 West 17th Avenue.
Captain J. M. Mason, USN, and Staff.

The sequence of courses is the same for all officer
candidate students for the first two years. At the
end of the second year, students may apply for the
Marine Corps Option, in which case there is a
variation in course presentation. All candidates are
required to complete a course in American Military
Affairs and a course in National Security Policy
before graduation. Candidates enrolled in engineering,
physics, chemistry, and mathematics, or in education
with teaching majors in mathematics and physical
science must complete three quarters of calculus,
three quarters of physics or chemistry, and one
quarter of computer science by the end of the third
year in the NROTC program. Candidates enrolled in
arts, humanities, business, political science,
economics and education with teaching majors in
areas other than physical science or mathematics,
must complete three quarters of calculus or statistics,
three quarters of physics or chemistry or biological
science or earth science, and one quarter of computer
science by the end of the third year in the NROTC
program.
Candidates should consult the appropriate Naval
Science Department instructor when preparing class
cohoruses. Naval science courses are open to a
limited number of civilian students with permission
of the Professor of Naval Science.

Normal sequence of Naval Science courses is as
follows:
First Year: All candidates—151, 152, 153.
Second Year: All candidates—251, 252, 253.
Third Year: Line candidates—341, 342, 343.
Marine candidates—351, 352, 353.
Fourth Year: Line candidates—461, 462, 463 or
461, 472, 473
Marine candidates—451, 452, 453
151 U 3
Principles of Naval Organization and Administration
A. 3 cl., 1 2-hr. lab.
Prereq.: Enroll in NMCUU Unit.
Introduction to the structure and principles of naval organization and management.

152 U 3
Naval Administration and Introduction to Naval Ships Systems
W. 3 cl., 1 2-hr. lab.
Prereq.: 151.
Continuation of naval organization and management practices and a familiarization of types, structure, and purpose of ships.

153 U 3
Naval Ships Systems
Sp. 3 cl., 1 2-hr. lab.
Prereq.: 152.
Study of ships compartmentation, propulsion systems, auxiliary power systems, ship design, stability, and safety.

251 U 2
Seapower and Maritime Affairs I
A. 1 2-hr. lab.
Prereq.: 153.
An analysis of seapower and maritime affairs as related to the naval forces of the United States.

252 U 2
Seapower and Maritime Affairs II
W. 1 2-hr. lab.
Prereq.: 251.
A continuation of 251.

253 U 2
Seapower and Maritime Affairs III
Sp. 1 2-hr. lab.
Prereq.: 252.
A continuation of 252.

341 (641) U 3
Naval Operations
Sp. 3 cl., 1 2-hr. lab.
Prereq.: 343.
A study of fleet operations, including tactics, tactical communications; rules of the Nautical Road, and the principles of relative motion.

342 (642) U 3
Naval Operations and Introduction to Navigation
A. 3 cl., 1 2-hr. lab.
Prereq.: 253.
A study of the Naval Communications system, shipboard organization, administration and the electronic and dead reckoning methods of marine navigation.

343 (643) U 3
Celestial Navigation
W. 3 cl., 1 2-hr. lab.
Prereq.: 342.
The determination of position by celestial methods of navigation.

351 (651) U 3
Evolution of the Art of War, Part I
A. 3 cl., 1 2-hr. lab.
Prereq.: 253 or completion of summer camp.
A study of the evolution of weapons and tactics, illustrating the principles and variables of war used in certain battles from Alexander through the Mexican War.

352 (652) U 3
Evolution of the Art of War, Part II
W. 3 cl., 1 2-hr. lab.
Prereq.: 351.
A continuation of the study of evolution of the art of war from the beginning of the Civil War to the end of World War II.

353 (653) U 1
Modern Basic Military Strategy and Tactics
Sp. 1 2-hr. lab.
Prereq.: 352.
A survey of modern strategic and tactical principles, and current military developments.

451 (751) U 3
Amphibious Warfare, Part I
A. 3 cl., 1 2-hr. lab.
The history of amphibious warfare and its development from Gallipoli through Korea.

452 (752) U 3
Amphibious Warfare, Part II
W. 3 cl., 1 2-hr. lab.
A familiarization with the doctrinal techniques and present concepts of amphibious warfare including the planning phase.

453 (753) U 1
Leadership and the Uniform Code of Military Justice
Sp. 1 2-hr. lab.
Survey of the UCMJ and a study of the psychology of human relationships and techniques of leadership as applied by Marines.

461 U 3
Naval Weapons Systems I
3 cl., 1 2-hr. lab.
Prereq.: 343.
Investigation of concept and technique of weapons systems, linear analysis of ballistics, and the dynamics of the basic components of weapons control systems.
462  U 3  
Naval Weapons Systems II  
3 cl., 1 2-hr. lab.  
Further development of the basic principles of naval  
weapons, phases of weapons control, propulsion  
systems, trajectories, flight paths, and damage criteria.

463  U 3  
Naval Weapons Systems III  
Sp. 3 cl., 1 2-hr. lab.  
Prereq.: 462.  
Solutions to weapons and control problems design and  
testing of weapons, and evaluation of weapons  
systems.

472  U 3  
Naval Weapons Systems IV  
W. 3 cl., 1 2-hr. lab.  
Prereq.: 461 and permission of instructor,  
Further development of the basic principles of naval  
weapons.

473  U 3  
Naval Weapons Systems V  
Sp. 3 cl., 1 2-hr. lab.  
Prereq.: 472 and permission of instructor,  
Detailed description of naval weapons systems.

Materials of Nuclear Technology  
(See under Met. E. 675.)

710  U G 3  
Applied Nuclear Engineering  
A, Sp. 3 cl.  
Prereq.: Physics 551 or equiv., Math, 225, and Engr.  
Mech. 429.  
Industrial and research applications of radioactive  
isotopes; thickness and density, food irradiation, direct  
energy conversion, activation analysis, radioactive  
tracers, and topics in bioengineering.

712  U G 3  
Introduction to the Production, Interaction, and  
Detection of Nuclear Radiations  
A. 3 cl.  
Prereq. or concur.: Physics 551.  
Nuclear structure, stability, reactions, and decay;  
interactions of electromagnetic and charged particle  
radiation with matter, scattering theory and  
bremsstrahlung; basic processes in radiation  
measurements and radiation damage.

716  U G 3  
Nuclear Plant Safety  
Sp. 3 cl.  
Prereq.: 660 and Chem. E. 778.  
Modeling theory developed and applied to nuclear  
systems to facilitate analysis of possible nuclear  
accidents; nuclear incidents, accident description  
criteria for evaluation, nuclear plant siting and  
operational procedures.

720  U G 3  
Reactor Dynamics and Control  
Sp. 3 cl.  
Prereq.: 660 and Elec. E. 520 or permission of instructor.  
Not open to students with credit for 528.  
Nuclear reactor and nuclear reactor system operation;  
control system performance requirements and control  
mechanisms; automatic control systems and their  
performance with transient and with steady state  
operation.

Nuclear Power Plants  
(See under Mech. E. 726.)

743  U G 3  
Nuclear Engineering Laboratory I  
Su, A, W, Sp. 2 3-hr. lab.  
Prereq.: Physics 551 or equiv., and Math. 255.  
Experimental investigations of nuclear radiation  
interactions with matter; a discussion and experimental  
verification of radiation detection and shielding  
principles.

744  U G 3  
Nuclear Engineering Laboratory II  
Su, A, W, Sp. 2 3-hr. lab.  
Prereq.: 660 and 743.  
Experimental nuclear reactor analysis; understanding  
of the basic nuclear and reactor parameters and  
utilizing these fundamentals concepts in an economical  
engineering design.
Nuclear Instrumentation
Su, A, W, Sp. 2 cl., 1 3-hr. lab.
Prereq.: 743, Elec. E. 520 or equiv., and Physics 571; or permission of instructor.
Repeatable to a maximum of 9 cr. hrs.
A study of radiation detectors, measuring instruments, block diagrams and circuits; discussion of applications to nuclear research and applied measurement systems.

Analysis of Neutron Chain Reactions
W. 3 cl.
Prereq.: 660 and Math. 512; concur. Physics 571; or permission of instructor.
The neutron distributions in infinite and finite media are analyzed with particular emphasis placed upon asymptotic solutions, space dependent slowing down theory, multigroup slowing down theory, and transport theory.

Nuclear Reactor Analysis
Sp. 3 cl., 1 2-hr. lab.
Prereq.: 765.
Not open to students with credit for 763.
Reactor theory, probability concepts and nuclear cross sections, the multiplication constant and neutron flux, neutron slowing down process, diffusion theory, Fermi Age Theory, homogenous reactors, heterogeneous reactors, and reactor kinetics.

Numerical Methods in Reactor Analysis
Sp. 3 cl.
Prereq.: 766, Math. 514, and Engr. Gr. 200 or equiv.
The calculations of nuclear reactor properties using matrix methods and iterative procedures; primary emphasis on the age-diffusion theory multigroup methods.

Plasmas and Controlled Fusion
W. 3 cl.
Prereq.: Physics 571; and Mech. E. 511, Physics 742, or equiv.
The Thermonuclear problem; approaches to a stable and sufficiently hot plasma; nuclear reactions, plasma kinetics, diagnostic devices, and engineering problems in research, development, and power production.

Nuclear Chemical Engineering
(See under Chem. E. 778.)

Effects of Radiation Interactions in Matter
W. 3 cl.
Prereq.: 12 cr. hrs. in Nuclear E., Physics 728 and 761; or permission of instructor.
Effects of high-energy radiation in liquids, in gases, and in solids; ionization effects, the effect of atomic displacements, and the effect of transmutation of nuclei on mechanical and physical properties of materials; possible applications in nuclear devices.

Radiation Shielding
A. 3 cl., 1 3-hr. lab.
Prereq.: 12 cr. hrs. in Nuclear E. and permission of instructor.
A classical and quantum-mechanical analysis of radiation interaction processes and shielding principles; microscopic and macroscopic scattering and absorption theory, bremsstrahlung and fluorescence, buildup, and optimum shield design utilizing high speed computers.

Non-linear Neutron Kinetics
A. 3 cl.
Prereq.: 720.
Non-linear dynamics of steady state and pulsed nuclear reactor systems; stability criteria, start-up and shut-down transients, and applications to thermal and fast reactors.

Advanced Laboratory Studies
Prereq.: 743 or 744, and permission of instructor.
Experimental treatment of advanced nuclear engineering concepts.

Particle Transport in Nuclear Engineering Systems
Sp. 3 cl.
Prereq.: 765 and 814.
Analysis of the transport of nuclear particles in electromagnetic fields and in solids; the interactions with fields, nuclei, and quasi-particles.

Advanced Nuclear System Design Concepts
Sp. 3 cl., 3-hr. lab.
Prereq.: 864, and Mech. E. 726.
Investigation of advanced-converter-reactor design concepts, design problems and basic concepts of thermal and fast breeder reactors, design, and economics study of a total reactor system.

Specialized Nuclear Energy Conversion Systems
Su, W. 3 cl.
Prereq.: 720, 744, 770, or permission of instructor.
Energy conversion systems used in conjunction with remotely operated and/or small nuclear energy sources; nuclear rocket, nuclear reactor power supplies for space and remote areas, direct energy conversion applications, and system design.

Breeder Reactor Design
A. 3 cl.
Prereq.: 765, 864, or permission of instructor.
Design concepts pertinent to nuclear power reactors which produce fuel; thermal and fast breeders, breeding ratios, criticality calculations, coolant properties, fuel cycles, and nuclear criticality calculations.
Advanced Nuclear Reactor Analysis
W, 5 ct.
Prereq.: 766, 720, Math. 602, and Physics 621 or 721.
Neutron transport theory, three dimensional multigroup reactor analysis utilizing perturbation theory, new reactor concepts; a high-speed digital computer is utilized to facilitate analysis.

Nuclear Engineering Seminar
Prereq.: Grad. standing in Nuclear E.
Repeatable to a maximum of 4 cr. hrs.
Current topics in nuclear engineering.

Advanced Topics
Prereq.: Permission of instructor.
Repeatable to a maximum of 10 cr. hrs.
An advanced treatment of some field of nuclear engineering of current interest not presently covered in other courses; topic to be announced for each quarter.

Research in Nuclear Engineering
Research for thesis or dissertation purposes only.

Pediatric Anesthesia
Prereq.: 402 or 502.
Not open to students with credit for 503.
Advanced study of introductory and clinical anesthesia as applicable to pediatric anesthesia; training is received at the affiliated Children's Hospital.

Advanced Anesthesia I
Prereq.: 403 or 503.
Not open to students with credit for 504.
Repeatable to a maximum of 45 cr. hrs.
Emphasis of study will be on more difficult anesthetic procedures and in patients with difficult disease processes.

Advanced Anesthesia II
Prereq.: 404 or 504.
Not open to students with credit for 505.
Instruction in the care of the patient undergoing cardiopulmonary bypass and thoracic anesthesia.

Advanced Anesthesia III
Prereq.: 405 or 505.
Not open to students with credit for 506.
Instruction in the care of the patient undergoing neurosurgery.

Nurse Anesthesiology
(School of Allied Medical Professions)
Office 632 University Hospital, 410 West Tenth Avenue
Instructor Lang (Division Director); Professor Haimleiberg.

Introduction to Anesthesia
Prereq.: Graduation from an accredited school of nursing.
Not open to students with credit for 401.
Education and training of nurses in the field of anesthesia; management of technical aspects of anesthesia under physician supervision.

Clinical Anesthesia
Prereq.: 401 or 501.
Not open to students with credit for 402.
Advanced study of anesthetic agents, technics, pharmacology, and physiology with clinical applications.

Nursing
Office: 145 School of Nursing Building, 1185 Neil Avenue
Professors King (Director), Newton (Emeritus), and Shirk; Associate Professors Bellam, Buckridge, Chambers, Clark, Harvey, Kruse, Leazenbee (Emeritus), Lewis (Emeritus), Pease, Price, Reed, Stills, Thomas, and Wittmeyer; Assistant Professors Colver, Currey, Daubenmire, Dilley, Fey, Hickey, Keith, Krumen, Martin, Mourad, Pierce, Polyn, Roller, Schoenlaub, Schroeder, Schwartz, Shaw, Sparkman, Suhr, Wallace, and Williams.

Introduction to Clinical Experiences for Medical Technologists
Su. 2 cr.
Prereq.: Med. Tech. 4th yr. standing.
Acquaints medical technology students with hospital and health center functioning and helps them develop selected patient-care skills. Price and Stiff.
Open only to students registered in the School of Nursing.
301 (539)  U 6
Fundamentals of Nursing
A. 3 cl., average of 12 hrs. clinical study per wk.
Prereq.: Anatomy and Microbiol. 509.
Study of basic needs of hospitalized adult patients and the
functions of the nurse in meeting these needs.
Wittmeyer and Staff.

310 (547)  U 8
Medical Nursing I
W, Sp. 4 cl., 16 hrs. clinical study.
Prereq.: 301.
The nursing care of adult patients treated medically;
emphasis on care required by patients with cardiovascular
and gastrointestinal problems and diabetes mellitus. Price and Staff.

311 (548)  U 8
Surgical Nursing I
W, Sp. 4 cl., and average of 16 hrs. clinical study per wk.
Prereq.: 301.
Care of adult patients who have common surgical
procedures and require minimal rehabilitation.
Wittmeyer and Staff.

350 (604)  U 8
Problem Solving in Nursing
A, W, Sp. 3 cl., and average of 12 hrs. clinical study per wk.
Prereq.: 310, 311, English 103, Microbiol 509, Physiol. 311,
Psychol. 300, and Sociol. 311.
The process of planning, providing, and evaluating
nursing care of selected patients.

410 (647)  U 8
Medical Nursing II
Su, A, W, Sp. 4 cl., and average of 16 hrs. clinical study per wk.
Prereq.: 310 and 311.
Nursing care of patients with long-term illness and
those requiring intensive rehabilitation; emphasis on
patients with problems associated with respiratory,
musculoskeletal and nervous systems. Williams.

421 (614)  U 8
Pediatric Nursing
Su, A, W, Sp. 4 cl., and average of 16 hrs. clinical study
conf. and field trips.
Prereq.: 310, 311, and Home Ec. 363.
Physiological and psychological changes occurring in
the growing child and the impact of illness or handicap
on the child, the family, and community. Scheyer.

530 (617)  U 5
Introduction to Community Health
Su, A, W, Sp. 5 cl.
531.
Not open to students with credit for 602 and 639.
Study of community health problems and services;
community nursing functions in relation to problems
and services. Roller.

531 (619)  U 8
Community Nursing
530.
Study of interaction of the nurse with individuals,
families, and community resources involved in
identifying and meeting health needs; characteristics
and resources of a nursing area. Roller.

540 (663)  U 8
Nursing Study of the Psychiatric Patient
Su, A, W, Sp. 4 cl. and average of 16 hrs. clinical study
per wk.
Prereq.: 410, 411, 420, and 421.
Nursing study of the psychiatric patient as an
interpersonal, problem-solving process; (conferences,
discussions, and clinical practice).

552  U 8
The Nursing Process with Groups of Patients
Su, A, W, Sp. 4 cl., 16 hrs. clinical study.
Prereq.: Nurs. 4th yr. standing; concur. 555.
Not open to students with credit for 550.
Study and application of decision-making and concepts of
management related to nursing process with groups of
patients in the team leader/member roles. Kruse and Staff.

553  U 7
Care of the Critically Ill Patient
Su, A, W, Sp. 4 cl., 12 hrs. clinical study.
Prereq.: Nurs. 4th yr. standing; concur. 552.
Study of the nursing care of critically ill patients with emphasis on synthesis of information to
produce a plan that will have desired effects. Kruse and Staff.

560  U 4
History, Trends, and Issues in Nursing
Su, A, W, Sp. 4 cl.
Prereq.: Nurs. 3rd or 4th yr. standing.
Consideration of social, economic, and cultural forces
influencing nursing and nursing education in the
United States, 1870 to present with emphasis on 1930
to present; responsibilities and opportunities of the
profession.
Field Instruction in Nursing
Su, A, W, Sp. 2 cr., 4 hrs. clinical experience per cr. hr.
Prereq.: Permission of instructor.
The first qtr. of registration in this course must be for 4 cr. hrs.
Application of scientific method of study to selected nursing and teaching problems; includes observation and participation in clinical situation, conferences, library study, field trips, and written reports.
802.03 Supervision and Administration
802.04 Teaching
Pease.

Individual Studies in Nursing
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Reading, conferences, and minor investigation by an individual student who wishes to study a particular nursing problem intensively.

Interdepartmental Seminars
Repeatable by permission of School Secretary.
(See under Interdepartmental Seminars, University Academic Policies and Course Offerings catalog.)

Research Development in Nursing
A, W, Sp. 3 cr.
Not open to students with credit for 785.
Status and scope of research in nursing; written reports and comparison of various types of research studies will be required. Shirk and Pierce.

Medical-Surgical Nursing
A. 3 cr., 8 lab.
Not open to students with credit for 710.
Intensive study of medical-surgical problems; independent study and participation in conferences and seminars. Chambers and Bellam.

Medical-Surgical Nursing
W. 3 cr., 8 lab.
Prereq.: 810.
Not open to students with credit for 711.
Continuation of 810. Chambers and Bellam.

Medical-Surgical Nursing
Sp. 3 cr., 8 lab.
Prereq.: 811.
Continuation of 811. Chambers and Bellam.

Pediatric Nursing I
A. 3 cr., 8 hrs. field study.
Prereq.: Home Ec. 890.
Study of the well child and his family; child-parent-nurse interaction in promoting and supporting physical and psychosocial aspects of child care. Bellam.

Pediatric Nursing II
W. 3 cr., 8 hrs. field study.
Prereq.: 821.
Application of knowledge from physical and behavioral sciences in assisting the sick or handicapped child (newborn-6 years) and his family. Bellam.

Pediatric Nursing III
Sp. 3 cr., 8 hrs. field study.
Prereq.: 822.
Application of knowledge from physical and behavioral sciences in assisting the sick or handicapped child (school age-adolescent) and his family. Bellam.

Psychiatric-Mental Health Nursing I
A. 3 cr., 8 lab.
Not open to students with credit for 740.
Theoretical principles of human behavior, nature of nursing problems, "field" in which nursing takes place and psychotherapeutic nursing intervention systematically investigated; seminars, conferences, and individual study. Sills.

Psychiatric-Mental Health Nursing II
W. 3 cr., 8 lab.
Prereq.: 840.
Not open to students with credit for 741.
Continuation of 840. Sills.

Psychiatric-Mental Health Nursing III
Sp. 3 cr., 8 lab.
Prereq.: 841.
Continuation of 841. Sills.

Psychiatric-Mental Health Nursing IV
A. 5 cr., 20 hrs. clinical experience.
Prereq.: 840, 841, and 842.
Repeatable to a maximum of 20 cr. hrs.
Seminars focus on community and social systems, theories, and modes of psychotherapeutic intervention; supervised individual and group practice in a variety of community agencies. Sills.

Administration of Nursing Service
A, Sp. 5 cr.
Prereq.: 812 or 842 and Bus. Admin. 500.
Not open to students with credit for 750.
Study of fundamentals of planning, organizing, staffing, directing, and controlling nursing service departments.
851 \( G \ 5 \)
Administration of Nursing Service
Su, W. 5 cr.
Prereq. 850.
Not open to students with credit for 751.
Continuation of 850 with exploration of major problems of nursing service administration at the supervisory level.

870 \( G \ 5 \)
Curriculum Development
A, Sp. 5 cr.
Prereq.: 812 or 842, Psychol. 560 or 600, and Ed. 637 and 939 or 941.
Not open to students with credit for 770.
Study of philosophy of nursing education as synthesized from theory of learning, philosophies of nursing and education; curriculum development in nursing. Paper.

770 \( G \ 4 \)
Methods of Teaching Nursing
A, W, Sp. 4 cr.
Prereq., or concur.: Ed. 637; Nurs. 870 recommended.
Not open to students with credit for 771.
Instructional planning for courses in clinical nursing with opportunities to develop teaching-learning units and tools to assess learning outcomes. Paper.

880 \( G \ 2-5 \)
Seminar
Repeatable to a maximum of 30 cr. hrs.
Discussion of issues, trends, and problems in nursing, topics to be announced.

994 \( G \ 2-5 \)
Group Studies in Nursing
Prereq.: Permission of instructor.
Repeatable to a maximum of 5 cr. hrs.
Reading and group conferences for graduate students who desire to study a particular trend in nursing or nursing education.

999 \( G \ Arr. \)
Research in Nursing
Research for thesis purposes only.
Individual Studies in Obstetrics and Gynecology
1 month, offered all months. P 6, 12, 18
Prereq.: Permission of chairman.
Repeatable to a maximum of 18 cr. hrs. for professional credit.
Clinical, laboratory, conference, and library work in obstetrics and/or gynecology.
793.01 Obstetrics Specialties
793.02 Gynecologic Specialties

Residency in Obstetrics and Gynecology
12 months full time, beginning July 1.
Prereq.: Appointment as Resident, University Hospital.
Repeatable to a maximum of 360 cr. hrs.
Rotation through obstetric and gynecologic sub-specialties, inpatient and outpatient services; supervision and teaching responsibility in the patient care team; rounds and conferences.

Obstetric and Gynecologic Pathology
Prereq.: Permission of instructor.
Repeatable to a maximum of 8 cr. hrs.
Laboratory, conference, and library work; study of current pathological specimens with emphasis upon special investigation. Uterus, Meiling, Hollenbeck, Holzapek, Williams, and Boutsells.

Research in Obstetrics and Gynecology
Research for thesis purposes only.

Occupational Therapy
(School of Allied Medical Professions)
Office: B-209 Starling Loving Hall, 320 West Tenth Avenue
Professor Locher (Division Director); Assistant Professors Buckey, Johnson, and Ross; Instructor Worley.

Survey of Occupational Therapy
Su, A, W. 1 cl.
The development of occupational therapy and survey of its relationship, history, standards, trends, applications, personnel, opportunities, and problems. Locher.

Occupational Therapy Orientation
A. 2 cl.
Prereq.: Registration in Oc. Ther. curriculum.
The scope of occupational therapy is presented with its relationship to broad fields of education and medicine, and to other allied health professions. Buckey, Locher, and Worley.

Occupational Therapy Orientation
W. 1 cl., 2 labs.
Prereq.: 201.
Continuation of 201.

Occupational Therapy Orientation
Sp. 1 cl., 2 labs.
Prereq.: 202.
Continuation of 202.

Occupational Therapy
Su, A, W, Sp. 2 hr. lab.
Repeatable to a maximum of 4 cr. hrs.
Additional preclinical experiences. Locher.

Departmental Organization
A. 2 cl.
Prereq.: Registration in Oc. Ther. curriculum.
Occupational therapy relationships within the institution and community; a study in program planning based on treatment methods including budgets, equipment, supplies, records, and staffing implications. Buckey.

Occupational Therapy
Sp. 2 cl., 3 2-hr. lab.
Evaluation and treatment principles and methods through activity in cases of loss of muscle power, limited joint motion, and amputation. Worley.

Occupational Therapy
W. 5 cl., 3 2-hr. lab.
Prereq.: Psychol. 330.
Information, discussion, and demonstration of medical problems, and use of activities, self, and groups in the total treatment program of neuropsychiatric and mentally deficient patients. Buckey and Psychiatric Staff.

Occupational Therapy
A. 2 cl., 3 2-hr. labs.
Prereq.: 403.
Not open to students with credit for 405.
Principles and methods of treatment in cases of lack of coordination; adaptation of equipment to meet activity needs of the individuals so involved. Worley.
Ophthalmology

Office: N-350 University Hospital, 410 West Tenth Avenue

Professors Makley (Chairman), Blackwell, Havener, and Perry (Emeritus); Associate Professors Andrew, Battles, Biersdorf, Bredemeyer, Kasparetsky, Keatts, Magnuson, Moses, Quinn, and Snie; Assistant Professors Barton, Bitonti, Bonville, de la Motte, Latson, Long, Lubow, Sago, Simmons, Stine, and Wachtel.

The Comprehensive Evaluation of the Patient
(See Med. 661, 662, and 603.)
[A unique presentation in programmed learning of ophthalmoscopic findings as they relate to various systemic disorders.]

Clinical Practice in Occupational Therapy
Prereq.: An average point-hour ratio of 2.25 in all professional courses and permission of divisional director.
Not open to students with 18 cr. hrs. for 420.
Repeatable to a maximum of 18 cr. hrs.
(Initial registration in this course may come in the Su. following the completion of the 6th qtr. of the professional program and may be either for one term or the qtr.)
A practical experience in application of the principles and functions of occupational therapy in selected hospitals, rehabilitation centers, day care facilities, and convalescent homes. Johnson.

Ophthalmic Seminar
W. 1 cl.
Prereq.: Major standing in Oc. Ther.
Not open to students with credit for 415.
Discussion and demonstration of current methods and problems in occupational therapy. Locher.

Ophthalmic Seminar
Sp. 1 cl.
Prereq.: 415 or 595.
Not open to students with credit for 416.
Continuation of 595.

Occupational Therapy Seminar
A. 1 cl.
Prereq.: 416 or 596.
Not open to students with credit for 417.
Continuation of 596.
Optometry

Office 111 Optometry Building, 338 West Tenth Avenue
Professors Hebbard (Dean), Fry, and Hill; Associate
Professor Eskridge; Assistant Professors Bailey,
Fugate, Haines (Emeritus), Kerr, Mote, and Warshaw;
Instructors Albright, Carafa, Cooper, Jezelak, Lowther,
Neely, Pratt, Runyan, Schossler, Uniacke, and
Zimmerman.

401  P 1
Survey of Optometry
A. 1 cl.
Prereq.: Optom. 1st yr. standing.
Development of optometry and optometric education;
scope of optometric services; sources of vision
information; kinds of current vision research.

411  P 3
Intermediate Geometric Optics
Sp. 3 cl.
Prereq.: Optom. 1st yr. standing and Physics 435.
Thick-lens optics; image evaluation; application to
optometric systems.

431  P 5
Optomalic Optics I
W. 4 cl., 1 2-hr. lab.
Prereq.: Optom. 2nd yr. standing and 411.
Optomalic optics of single-vision and multifocal
spectacle lenses; measurement and inspection of
spectacle lenses; manufacturing processes.

432  P 5
Optomalic Optics II
Sp. 4 cl., 1 2-hr. lab.
Prereq.: 431.
Optomalic lens design; minimizing lens aberrations;
theory and practice in fitting and adjusting spectacles.

433  P 4
Optomalic Optics III
A. 3 cl., 1 2-hr. lab.
Prereq.: 432.
The optics of corneal and scleral contact lenses;
laboratory exercises in inspecting, measuring, edging,
surfacing, and modifying contact lenses.

441  P 4
Practical Optometry I
A. 3 cl., 1 3-hr. lab.
Prereq.: Optom. 2nd yr. standing, Phys. 112, and Math.
150.
Theory and techniques of keratometry, skiascopy,
objective and subjective tests of refraction,
accommodation, and functions of the extra-ocular
muscles.

442  P 4
Practical Optometry II
W. 3 cl., 1 3-hr. lab.
Prereq.: 441.
Correction and analysis of data; systematic
determination of the etiology of anomalies and sources
of visual discomfort and inefficiency; corrective
procedures and prescription writing.

443  P 4
Practical Optometry III
Sp. 3 cl., 1 3-hr. lab.
Prereq.: 442.
Ophthalmoscopy and examination of the external parts
and the media of the eye; case histories; techniques of
investigating special types of anomalies; corrective
procedures.

641  P 5
Clinical Practice in Optometry I
Su, A, W, Sp. 2 cl., 3 3-hr. lab.
Prereq.: 443.
Clinical practice in examining eyes and carrying out
corrective procedures; the conference periods are
devoted to the discussion of problems encountered
during the clinic periods.

642  P 5
Clinical Practice in Optometry II
Su, A, W, Sp. 2 cl., 3 3-hr. lab.
Prereq.: 641.
Continuation of 641.

643  P 5
Clinical Practice in Optometry III
Su, A, W, Sp. 2 cl., 3 3-hr. lab.
Prereq.: 642.
Continuation of 642.

651  P 4
Orthoptics
Sp. 3 cl., 1 2-hr. lab.
Prereq.: Optom. 3rd yr. standing and 443.
Definitions, characteristics, incidence, and
phenomenology of visual problems producing loss or
inefficiency of binocular vision; diagnosis, prognosis,
and orthoptic treatment of such problems.

652  P 4
Aniseikonia and Low Vision
W. 3 cl., 1 2-hr. lab.
Prereq.: Optom. 3rd yr. standing and 443.
Etiology; clinical methods of evaluating aniseikonia
and low vision; design of optical aids for such
conditions; environmental aids and agencies available
to the visually handicapped.
653  P 4
Contact Lenses I
W. 3 cl., 1 2-hr. lab.
Prereq.: Optom. 3rd yr. standing and 443.
The uses of contact lenses; theory and methods of fitting; specification and verification; post-fitting care; contact lens solutions.

654  P 4
Contact Lenses II
Sp. 3 cl., 1 2-hr. lab.
Prereq.: Optom. 653.
Theory and clinical methods involving meridional and bifocal contact lenses; fitting astigmatic corneas and aphakic eyes, haptic and keratoconic lenses; cosmetic shells and prosthetic eyes.

660  P 5
Ophthalmic Pathology
A. 5 cl., 6 lab. hrs.
Prereq.: Optom. 2nd yr. standing, Path. 650.
Gross and microscopic pathology of the eye, including diseases of the conjunctiva, orbital cavity, and pertinent pathology of the central nervous system.

701  (555)  P 4
Applied Pathology of the Eye I
Sp. 3 cl., 1 2-hr. lab.
Advanced ophthalmoscopy, slit lamp microscopy, tonometry, and other methods of detecting pathological conditions; systematic study of ocular diseases; artificial eyes and other prosthetic devices.

702  (566) P 4
Applied Pathology of the Eye II
A. 3 cl., 1 2-hr. lab.
Prereq.: 701.
Motor disturbances of eyes, paralytic strabismus, peripheral fixation anomalies, nystagmus, ptosis, ptosis crusts, anomalous accommodative and pupillary responses.

703  (557)  P 4
Applied Pathology of the Eye III
A. 3 cl., 1 2-hr. lab.
Prereq.: 702.
Visual fields; scotometry; subnormal central vision involving pathology; telescopic lenses and aids for subnormal vision; theory and practice in the use of contact lenses.

721 (561) P 3
Optometric Economics and Jurisprudence
W. 3 cl.
Prereq.: 643.
Historical background; legal status; practice building techniques; office accounting and general practice management; representative organization in optometry; professional ethics.

722  (563) P 3
Civic and National Problems in Eye Care
Sp. 3 cl.
Prereq.: 721.
Number, distribution, supply interrelationships, and roles of the various ophthalmic groups; prevalence of visual anomalies; governmental and public-health aspects of vision care.

741  (601) P 8
Advanced Clinical Practice in Optometry I
A, W, Sp. 2 cl., 18 hr. lab.
Prereq.: 643.
Advanced clinical practice; the conference periods are devoted to the discussion of problems and cases encountered during the clinic periods.

742  (602) P 8
Advanced Clinical Practice in Optometry II
A, W, Sp. 2 cl., 18 hr. lab.
Prereq.: Optom. 4th yr. standing and 741.
Continuation of 741.

743  (603) P 8
Advanced Clinical Practice in Optometry III
A, W, Sp. 2 cl., 18 hr. lab.
Prereq.: Optom. 4th yr. standing and 742.
Continuation of 742.

745  (545) P 3-5
Special Clinical Practice
Su, A, W, Sp. 1 cl., 2-4 3-hr. lab.
Prereq.: 443; concur. 641 and permission of instructor. Repeatable to a maximum of 15 cr. hrs.
Clinical experience in specialized phases of optometric practice, (a) subnormal vision, (b) aniseikonia, (c) vision in schools and industry, (d) orthoptics and (e) contact lenses.

Otolaryngology
Office: N-820 University Hospital, 410 West Tenth Avenue
Professors Saunders (Chairman) and Birck; Associate Professors Arthur, Miller, and Smith; Assistant Professors Lim, Lowery, Melnick, Migleta, Nilo, and VanMeenen; Instructor Wagtenbrenner.

The Comprehensive Evaluation of the Patient
(See Med. 601, 602, and 603.)
(Introductory consideration with other disciplines of the diagnosis and treatment of symptom complexes involving ear, nose, and throat; lectures, demonstrations, and films are used.)

728  P G 3
Otolaryngology-Surgical Aspects of the Anatomy of the Head and Neck I
A. 3 cl.
Prereq.: Permission of instructor.
Not open to students with 6 cr. hrs. for 820.
Must repeat to 6 cr. hrs.
Dissection of the head and neck with lectures and demonstrations of anatomical aspects especially of surgical interest to the otolaryngologist. Saunders and Birck.
750
Seminar in Otolaryngology
Prereq.: Permission of instructor.

750.01 Otopathology
W. 2 cl.
Not open to students with 2 cr. hrs. for 850.01
Must repeat to 2 cr. hrs.
Migels and Lim.

750.02 General Otolaryngological Pathology
Sp. 2 cl.
Not open to students with 2 cr. hrs. for 850.02
Must repeat to 2 cr. hrs.
Saunders.

750.03 Biostatistics
Sp. 2 cl.
Not open to students with credit for 850.03
Repeatable to a maximum of 4 cr. hrs.
Melnick.

750.04 Audiological Considerations in Otolaryngology
A. 2 cl.
Not open to students with credit for 850.04.
Repeatable to a maximum of 4 cr. hrs.
Nilo.

751
Special Group Studies in Otolaryngology
1 month offered Oct. and Feb.
Prereq.: Med. 4th yr. standing.
Clinical work in basic otolaryngology as encountered in general practice and other medical specialty practice.

753
Individual Studies in Otolaryngology
1, 2, or 3 months; offered all months.
Prereq.: Med. 3rd or 4th yr. standing and permission of instructor.
Repeatable to a maximum of 18 cr. hrs.
Research problems in otolaryngology involving work in animal laboratory, temporal bone laboratory, audiology section and library; scheduled seminars and grand rounds, but no routine patient care.

754
Group Studies in Otolaryngology
1 month, offered all months except June.
Prereq.: Med. 3rd or 4th yr. standing.
Clinical application of the principles of otolaryngology with patients in clinic and operating room; at least one hour daily supervised teaching by staff members; instruction by slides, films, seminars, and personal supervision. Saunders and Staff.

793
Pathology
Office: 4170 Medical Basic Science Building, 370 West Ninth Avenue

Professors Geer (Chairman), Davidson, Frajola, Griesemer, Koestner, Lisa, Macpherson, Newton, Stevenson, and vonHamm; Associate Professors Gruemer, Holaday, Newman, Reiner and Old; Assistant Professors Asnor, Baba, Benthon, Bishop, Cavelarri, Ceelen, Davidson, Davis, Diederichs, Elektor, Euzebuzuk, Fidler, Gruemer, Hurd, Johannman, Kirchham, Lewis, Lott, Martin, Murphy, Murthy, Nemoto, Thorne, van der Hoeven, van Soestbergen, and Vaughn.

501 (630) U 3
Medical Technology
Su. 3 cl.
Prereq.: Med. Tech. 4th yr. standing.
Hematology, urine analysis, clinical microscopy; blood bank, blood groups, blood types, and blood transfusions. Stevenson.

502 (631) U 3
Medical Technology
A. 3 cl.
Prereq.: Med. Tech. 4th yr. standing.
Clinical microbiology, serology, parasitology, and mycology. van Soestbergen.

503 (633) U 3
Medical Technology
W. 3 cl.
Prereq.: Med. Tech. 4th yr. standing.
Preparation of tissue for histologic examination by frozen and permanent sections; special stain techniques; immunohematology. McPherson.

504 (632) U 3
Medical Technology
Sp. 3 cl.
Prereq.: Med. Tech. 4th yr. standing.
Clinical blood and tissue chemistry, and modes of investigating diseases by biochemical methods. Gruemer and Staff.
Fundamentals of Disease
A. 3 cl.
Prereq.: Med. Tech. 4th yr. standing or permission of instructor.
The nature of disease, mechanisms involved in the disease process, and use of the laboratory in defining the mechanisms of disease. Macpherson and Staff.

Medical Technology
W. 2 cl.
Prereq.: Med. Tech. 4th yr. standing.
The use and interpretation of laboratory tests in medicine. Smetters and van Soestbergen.

Medical Technology
Sp. 2 cl.
Prereq.: Med. Tech. 4th yr. standing.
The use and interpretation of laboratory tests in medicine. Gruener.

Clinical Pathology
W. 4 cl., 2 2-hr. lab. P 6
W. 4 cl. G 4
Prereq.: For professional credit, Med. 2nd yr. standing; for grad. credit, permission of instructor.
A study of the changes in the blood, urine, feces, sputum, spinal fluid, and gastric contents brought about by disease. Macpherson and Stevenson.

General Pathology
A. 5 cl., 3 2-hr. lab. P 7
Prereq.: For professional credit, Med. 2nd yr. standing;
for grad. credit, permission of instructor.
Degenerative, circulatory, inflammatory, and neoplastic lesions; reactions to injury; pathology of infectious diseases. Geer and Staff.

Special Pathology
W. 2 cl., 2 2-hr. lab.
Prereq.: 624.
The pathology of the heart and blood vessels; the respiratory tract; the bone marrow, spleen, and lymph nodes; the gastrointestinal tract; the liver, biliary tract, and pancreas. Geer and Staff.

Special Pathology
Sp. 2 cl., 2 2-hr. lab.
Prereq.: 624.
Pathology of the urinary tract; the male and female genital organs; the endocrine glands, the central nervous system; the bones, muscles, and skin. Geer and Staff.

Pathology
A. 3 cl., 6 lab. hrs.
Prereq.: Optom. 2nd yr. standing.
General pathology including the etiology of infectious disease, disturbances of nutrition, inflammation, and neoplasia, with special reference to the influence upon ophthalmic pathology; selected chapters of Special Pathology; histologic and gross demonstrations.

General Pathology
Sp. 3 cl., 2 3-hr. lab.
Prereq.: Dent. 2nd yr. standing.
General pathology, including the etiology of diseases, disturbances of nutrition, inflammation, regeneration, and tumors.

Special Lectures in Pathology
Su, A, W, Sp. 3 cl.
Prereq.: Grad. standing; Med. 3rd or 4th yr. standing.
Repeatable to a maximum of 24 cr. hrs.
Lectures in special fields of pathology; one decimal subdivision will be offered each quarter.

Blood and Bone Marrow
Pathology of the blood and bone marrow with emphasis on the laboratory diagnosis of anemia. Stevenson.

Lectures in Clinical Chemistry
The metabolic basis of disease, interpretation of laboratory data, and clinical laboratory methodology. Gruener and Staff.

Surgical Pathology
Special problems in surgical pathology including frozen section techniques and the use of the cryostat. Holaday.

Neuropathology
Selected lectures on neuropathology. Liss.

Immunohematology
Diagnostic laboratory methods in immunohematology. Macpherson.

Exfoliative Cytology
Diagnostic exfoliative cytology including aspiration biopsy. von Haam.

Neoplasms of Children

Cellular Pathology
Cellular pathology with emphasis on ultramicroscopic changes in cell injury.

Individual Studies in Pathology
1, 2, 3, or 4 months.
Prereq.: Med. 3rd or 4th yr. standing; grad. standing; permission of instructor.

Pathologic Anatomy
P 5, 6, 12, or 18
3 months, offered all months.
Must repeat to 18 cr. hrs.
Geer and von Haam.

Principles of Clinical Cytology
P 5 or 12
2 months, offered Dec., Feb., Apr.
Must repeat to 12 cr. hrs.
Ceezen.

Automation and Instrumentation
P 5, 6, 12, 18
in Clinical Chemistry
G Arr.
1, 2, or 3 months; offered all months.
Repeatable to a maximum of 18 cr. hrs.
(When registration is for 3 professional cr. hrs., an additional 3 hr. professional course must be taken.)
Lott.
PATHOLOGY

793.04 Clinical Chemistry
1-3 months, offered all months. Repeatable to a maximum of 18 cr. hrs.
Gruener.

793.05 Neuropathology
3 months, offered Oct., Jan. Must repeat to 18 cr. hrs.
Liss.

793.06 Immunocytology
1 month, offered Sept., Mar., Apr., May.
Macpherson.

793.07 Clinical Microbiology
4 months, offered Nov. Must repeat to 24 cr. hrs.
Macpherson.

793.08 Pediatric Pathology
2 months, offered Sept., Nov., Jan., Apr. Must repeat to 12 cr. hrs.
Newton.

793.09 Surgical Pathology I
4 months, offered July, Nov. Must repeat to 24 cr. hrs.
Holaday.

793.10 Surgical Pathology II
2 months offered July, Sept., Jan., Apr. Must repeat to 12 cr. hrs.
Holaday.

793.11 Special Pulmonary Pathology
2 months, offered July. Must repeat to 12 cr. hrs.

793.12 Ultrastructure of Cells in Disease
2 months, offered Nov. Must repeat to 12 cr. hrs.

793.13 Laboratory Medicine—
the Erythrocyte
2 months, offered Sept. Must repeat to 12 cr. hrs.
Stevenson.

793.14 Problems in Experimental Pathology
4 months, offered Nov. Must repeat to 24 cr. hrs.
von Haam.

793.15 Problems in Pathology
1 month, offered all months for professional credit. Repeatable to a maximum of 18 cr. hrs.
and Clinical Pathology

798 P 18
Internship in Pathology
12 months full time, beginning July 1. Prereq.: Appointment as intern, University Hospital. Repeatable to a maximum of 72 cr. hrs. Rotation through the Divisions of Pathologic Anatomy and Surgical Pathology; primary responsibility for pathology service, work rounds, and staff conferences.

799 P 18
Residency in Pathology
18 months full time, beginning July 1. Prereq.: Appointment as Resident, University Hospital. Repeatable to a maximum of 288 cr. hrs. Rotation through all pathology and clinical pathology specialities: certain teaching responsibilities, conferences, and seminars.

850 (800) G 2
Seminar in Pathology and Clinical
Su, A, W, Sp. 1-2 hr. cr.
Prereq.: Grad. standing in Path. Discussion of pertinent literature, presentation and discussion of research work, and demonstration of fresh specimens and slides.

998 (950) G Arr.
Research in Pathology
Research for thesis or dissertation purposes only.

Pediatrics

Offices: Children's Hospital, 561 South 17th Street
N-118 University Hospital, 410 West Tenth Avenue

Professors Graham (Chairman), Allen Ambuel, Baxter (Emeritus), Coddington, Crumblitt, Hamarian, Hesler, Kontras, Newton, Shaffer, Soto, and Turner; Associate Professors P. Ertel, Gibson, Haynes, Helper, Meites, Naylor, Owen, Paulson, Rice, Robertson, Sherard, and Somerson; Assistant Professors Addoniki, Aubele, Boggs, Conant, Craenen, Eaton, Eberly, I. Ertel, Nachman, Nelson, Pollack, Reiner, Ruma, Ruppert, Thomas, Woo-Ming, and Young; Instructors Sommer and Wehe.

The Comprehensive Evaluation of the Patient

(See Med. 601, 602, and 603.)
[Multidiscipline approach to pediatrics patients exhibiting normal growth and development, and deviation from normal; physical diagnosis of infants and children.]

715 P 6 or 12
Clinical Pediatrics
2 months, offered July, Sept., Nov., Jan., Mar., or May.
Prereq.: Med. 3rd yr. standing. Must repeat to 12 cr. hrs.
Didactic and clinical instruction in pediatrics; presentation of health care of sick and well children.
793  Individual Studies in Pediatrics  
1, 2, 3, or 4 months.  
Prereq.: Permission of instructor.

793.01 Advanced Pediatric  
P 6, 12, 18  
1, 2, 3, or 4 months; offered all months except June.  
Repeatable to a maximum of 24 cr. hrs. for professional credit.
Graham.

793.02 Genetics  
P 6, 12, 18  
1, 2, or 3 months; offered all months except June.  
Repeatable to a maximum of 18 cr. hrs. for professional credit.
Kontras.

793.03 Infectious Diseases  
P 6, 12, 18  
1, 2, 3, or 4 months; offered all months except June.  
Repeatable to a maximum of 24 cr. hrs. for professional credit.
Cramblett.

793.04 Pediatric Cardiology  
P 6, 12, 18  
1, 2, or 3 months; offered all months except June.  
Repeatable to a maximum of 18 cr. hrs. for professional credit.
Hosier.

793.05 Developmental Diagnosis  
P 6, 12, 18  
1, 2, 3, or 4 months; offered all months except June.  
Repeatable to a maximum of 24 cr. hrs. for professional credit.
Scherard.

793.06 Blood Diseases of Infants and Children  
P 6, 12, 18  
1 month, offered all months except June.  
Newton.

793.07 Neonatal Research  
P 6, 12, 18  
1, 2, 3, or 4 months; offered all months except June.  
Repeatable to a maximum of 24 cr. hrs. for professional credit.
Robertson.

793.08 Adolescent Medicine  
P 6, 12, 18  
1, 2, or 3 months; offered all months except June.  
Repeatable to a maximum of 18 cr. hrs. for professional credit.
Shaffer.

793.09 Pediatric Endocrinology  
P 6, 12, 18  
1, 2, 3, or 4 months; offered all months except June and August.  
Repeatable to a maximum of 24 cr. hrs. for professional credit.
Sobos.

793.10 Pulmonary Diseases  
P 6, 12, 18  
1, 2 or 3 months; offered all months except June.  
Repeatable to a maximum of 24 cr. hrs. for professional credit.
Young.

793.11 Handicapped Child  
P 6, 12, 18  
1 month, offered all months except June.  
Repeatable to a maximum of 18 cr. hrs. for professional credit.
Ambuel.

793.12 Pediatric Practice  
P 6  
1 month, offered all months except June.  
Turner.

793.13 Renal and Electrolyte Disorders  
P 6, 12, 18  
1, 2, 3, or 4 months; offered all months except June.  
Repeatable to a maximum of 24 cr. hrs. for professional credit.
Nelson.

793.14 Nutrition Studies  
P 6, 12, 18  
1, 2, 3, or 4 months; offered all months except June.  
Repeatable to a maximum of 24 cr. hrs.
Owen.

793.15 Newborn Care  
P 6, 12, 18  
1, 2, 3, or 4 months; offered all months except June.  
Repeatable to a maximum of 24 cr. hrs.
Robertson.

793.16 Mental Retardation Training  
P 6, 12, 18  
1, 2, or 3 months; offered all months except August.  
Prereq.: Permission of instructor and Med. 3rd or 4th yr. standing.  
Repeatable to a maximum of 24 cr. hrs.
Gibson.

794  Group Studies in Pediatrics  
1, 2, 3, or 4 months.

794.01 Advanced Pediatric Problems  
P 6, 12, 18  
1, 2, or 3 months; offered all months except June.  
Prereq.: 715.  
Repeatable to a maximum of 18 cr. hrs.
Graham.

794.02 Ambulatory Pediatrics  
P 6, 12, 18  
1, 2, 3, or 4 months; offered all months except June.  
Prereq.: 3rd or 4th yr. standing.  
Repeatable to a maximum of 24 cr. hrs.
Ambuel.

794.03 Inpatient Pediatrics  
P 6, 12, 18  
1, 2, 3, or 4 months; offered all months except June.  
Prereq.: 3rd or 4th yr. standing.  
Repeatable to a maximum of 24 cr. hrs.
Graham and Staff.

794.04 Pediatric Cardiology  
P 6  
1 month, offered all months.  
Prereq.: 3rd or 4th yr. standing.
Hosier.

794.05 Pediatric Endocrinology and Metabolism  
P 6, 12, 18  
1, 2, 3, or 4 months; offered all months except Aug.  
Prereq.: 3rd or 4th yr. standing.  
Repeatable to a maximum of 24 cr. hrs.
Sobos.

794.06 Pediatric Hematology  
P 6  
1 month, offered all months.  
Prereq.: 3rd or 4th yr. standing.
Newton.

794.07 Adolescent Medicine  
P 6, 12, 18  
1, 2, 3, or 4 months; offered all months.  
Prereq.: 715.  
Repeatable to a maximum of 24 cr. hrs.
Shaffer.
Pharmacology

Office: 5086 Medical Basic Science Building, 370 West Ninth Avenue

Professors Marks (Chairman), Hollander, and Truitt; Associate Professors Fischer and Goldman; Assistant Professors Couri, Dutta, Engelman, and Lindower; Instructor Tesi.

600 UG 3

General Pharmacology
A. 2 cl., 1 3-hr. lab.
Prereq.: Physiol. Chem. 611; Physiol. 601, or permission of instructor.
Introduction to the general principles of pharmacology, drug classification, and the sites and mechanisms of drug action. Marks and Dutta.

601 UG 3

Laboratory Methods in Pharmacology
W. 1 cl., 2 3-hr. lab.
Prereq.: 600.
Biological, chemical, electronic, and mathematical techniques commonly employed in a pharmacology laboratory. Truitt. Fee.

610 UG 3

Toxicology and Drug Identification
W. 1 cl., 2 3-hr. lab.
Prereq.: 600.

700 PG 4

Medical and Mammalian Pharmacology
W. 4 cl.
Prereq.: 600 or permission of instructor.
General principles of pharmacology; drugs used for diagnosis, prevention or eradication of the cause of disease, including endocrine products and chemotherapeutic agents. Marks.

701 PG 5

Medical and Mammalian Pharmacology
Sp. 4 cl., 3 lab. hrs.
Prereq.: 700.
Continuation of 700. Fee.

770 P 3

Clinical Pharmacology and Therapeutics
May.
Prereq.: Med. 4th yr. standing; concur. Med. 770.
Application of clinical pharmacology; principles to the treatment of disease states. Tesi and Engelman.

793 Individual Studies in Pharmacology
1, 2, 3, months; offered all months except June.
Prereq.: Permission of instructor.
Cardiac arrhythmias; digitalis pharmacodynamics; neuropharmacology; endocrine pharmacology; advanced cardiovascular pharmacology; autonomic pharmacology.

Petroleum Engineering

(See Chemical Engineering)
Office: 335 Chemical Engineering Building, 140 West 19th Avenue.
Associate Professor Sluder.
820* G 3-15
Autonomic Pharmacology
A. 2 cr., lab. arr.
Prereq.: 701 or permission of instructor.
Not open to students with credit for 720.
Comprehensive review of drugs that mimic or affect the actions of autonomic neurones with emphasis on biochemical and cellular analysis of autonomic drug action. Marks and Dagiranjan.

821* G 3-15
Cardiovascular Pharmacology
W. 2 cr., lab. arr.
Prereq.: 701 or permission of instructor.
Not open to students with credit for 721.
Modern concepts of the action of drugs on the heart and circulation. Dutta.

822* G 3-15
Neuroendocrine Pharmacology
Sp. 2 cr., lab. arr.
Prereq.: 600 or 701.
Not open to students with credit for 722.
Levels of interaction of the nervous and endocrine systems. Goldman.

823 G 3-15
Pharmacology Related to Anesthesia
Su. 2 cr., lab. arr.
Prereq.: 701 or permission of instructor.
Not open to students with credit for 723.
The pharmacodynamics of anesthetic agents and of other drugs which modify the state of surgical anesthesia. Truitt.

824* G 3
Psychopharmacology
W. 2 cr. arr.
Prereq.: 600, 701, or permission of instructor.
Psychotropic drug-induced changes in central nervous system activity in relation to the varieties of perceptual-behavioral interpretations of that activity by self-referential systems, i.e. men. Fischer.

845* G 5-15
Bioelectric Potentials
W. 5 cr., lab. arr.
Prereq.: Physiol. 601, 602 or equiv. or permission of instructor.
Not open to students with credit for 745.
Methods of recording transmembrane potentials from cells; interpretation of cell potentials; effects of drugs on transmembrane potentials. Holland.

850 (750) G 2
Seminar in Pharmacology
Prereq.: Permission of instructor.
Conferences on selected topics in pharmacology.

851* G 3-15
Steroid Pharmacology
Sp. 2 cr., lab. arr.
Prereq.: 701 or permission of instructor.
Not open to students with credit for 751.
Pharmacology of steroids which affect special tissues, organs, or systems.

852* G 3
Drug Metabolism
A. 2 cr. arr.
Prereq.: 600 or 701 or permission of instructor.
Not open to students with credit for 752.
Discussions of mechanisms of biotransformation of drugs by enzymes, pharmacologic characteristics of these systems, and techniques for the study of drug metabolism. Court.

999 (950) G Arr.
Research in Pharmacology
Research for thesis or dissertation purposes only.

Pharmacy
Office: 217 College of Pharmacy, 500 West 12th Avenue
Professors Parks (Dean), Beal, Bope, Guth, LaPitus, Malips, Nelson, Yee, and Wolf; Associate Professors Burkman, Dolskoch, Knapp, Latiolais, Mitscher, Notaro, Olson, Patti, Salisbury, Sokoloski, and Wiltak; Assistant Professors Faller, Geral, Knapp, Miller, Reuning, Rodowkas, Schriner, Shaver, and Visconti; Instructors Berry, Bonicci, Borchem, Buerki, Cardoni, Hultman, Pontones, Roberts, Shoup, and Tschampel; Clinical Instructors Anderson, and Sherrin.

The areas of instruction and the courses in the College of Pharmacy comprising these areas are listed below:

PROFESSIONAL PRACTICE—475, 515, 600, 610, 611, 615, 603, 605, 715, 717.
MEDICINAL AND PHARMACEUTICAL CHEMISTRY—
PHARMACODYNAMY AND NATURAL PRODUCTS—450, 451, 533, 535, 704, 705, 795, 850, 851, 852, 855, 993, 999.
PHARMACY ADMINISTRATION AND SOCIAL SCIENCES IN PHARMACY—200, 400, 511, 512, 520, 523, 524, 525, 614, 625, 693, 695, 725, 826, 850, 953, 999.
200 U 3
The Rational and Irrational Use of Drugs
A. 3 cl.
Prereq.: Sophomore standing.
Not open for credit to students in the College of Pharmacy.
Survey of the fundamentals of drug action with special emphasis on drugs of abuse; discussion of medical, social, legal, and educational aspects of drug use. Nelson, Rodowskas, and Salisbury.

400 P 3
Introduction to Pharmacy
A. 4 cl.
A survey of the profession of pharmacy dealing with pharmacy's place in the health care system, its history, educational requirements, organization, regulation, and current development. Knapp and Salisbury.

401 P 5
Pharmaceutics I
W. 4 cl., 1 2-hr. lab.
The application of physical chemical principles to the manufacture of pharmaceuticals; the fundamental introduction to solid and liquid dosage forms. Malspeis, Anderson, Sherrin, Berry, and Roberts. Fee.

402 P 5
Pharmaceutics II
Sp. 3 cl., 1 2-hr. lab.
Prereq.: 401.
The application of physical chemical principles to pharmaceutics: properties of solutions of pharmaceutical and medicinal compounds. Malspeis, Anderson, and Roberts. Fee.

432 P 5
Pharmaceutical Analysis
W. 3 cl., 2 2-hr. lab.
Prereq.: Chem. 221.
Methods for the qualitative and quantitative determination of drugs. Olson. Fee.

433 P 3
Medicinal Chemistry
Sp. 3 cl.
Prereq.: Chem. 220 or equiv.
An introduction to the chemistry of biologically active organic compounds; discussion of the synthesis, chemical properties and stereochemistry of compounds in major therapeutic classes. LaPidis, Miller, and Witlak.

435 (614) P 5
Bio-Pharmacy
Sp. 4 cl., 1 2-hr. lab.
Prereq.: Chem. 220 or equiv.

450 (521) P 4
Pharmacognosy
A. 4 cl.
Prereq.: Chem. 220 or equiv.
A study of the history, source, identification, constituents, and medicinal preparations of some of the more important drugs of biological origin. Beal, Doskotch, and Mitscher.

451 (522) P 5
Pharmacognosy
A. 4 cl., 1 3-hr. lab.
Prereq.: Chem. 232 or equiv. Doc. Mitscher, Doskotch, and Beal. Fee.

470 P 4
Pharmacology for Nurses
Sp. 4 cl.
Prereq.: Chem. 102 or 102, and Physiol. 312.
Open only to students registered in School of Nursing.
A survey of the important drugs used in medicine and a consideration of their therapeutic applications. Wolf, Nelson, Tye, and Burkman.

475 P 5
Introduction to Disease
Sp. 5 cl.
Prereq.: Anat. 200 and Physiol. 312.
A study of the nature and mechanisms of disease relative to the understanding of the action of drugs. Shaver and Tye.

503 P 5
Pharmaceutics III
A. 3 cl., 1 3-hr. lab.
Prereq.: 402.
The application of physical chemical principles to pharmaceutics: solubility and mixed solvents. Sokoloski, Malspeis, and Notari. Fee.

504 P 5
Pharmaceutics IV
W. 3 cl., 2 2-hr. lab.
Prereq.: 503.
The application of physical chemical principles to pharmaceutics: heterogeneous systems, emulsions, suspensions, gels, and magmas. Sokoloski, Malspeis, and Notari. Fee.

505 P 5
Pharmaceutics V
Sp. 3 cl., 2 2-hr. lab.
Prereq.: 504.
The formulation of compounded prescriptions and other dosage forms, with emphasis on drug availability, physiological requirements, incompatibility, prediction of stability and clinical effectiveness. Notari, Reuning, Anderson, and Roberts. Fee.
507 (521) P 3
Manufacturing Pharmacy
A. 1 cl., 2 3-hr. lab.
Prereq.: 402.
Formulation and mechanical fabrication of a wide
variety of pharmaceutical dosage forms. Guth.

508 (622) P 3
Manufacturing Pharmacy
W. 1 cl., 2 3-hr. lab.
Prereq.: 402.
A continuation of 507. Guth.

509 (623) P 3
Manufacturing Pharmacy
Sp. 1 cl., 2 3-hr. lab.
Prereq.: 402.
A continuation of 507. Guth.

511 (514) P 2
History of Pharmacy I
A. 2 cl.
Prereq.: 400.
A course designed to give the pharmacy student a
deeper appreciation of the background of pharmacy
and its development through the years. Buerk.

512 P 2
History of Pharmacy II
W. 2 cl.
Prereq.: 400.
A continuation of 511; emphasis on the development
of the profession of pharmacy in Great Britain and
the United States. Buerk.

515 (643) P 3
Hospital Pharmacy
A, W, Sp. 1 cl., 2 3-hr. lab.
Prereq.: 402.
Repeatable to a maximum of 9 cr. hrs.
Introduction to and clinical experience in hospital
pharmacy under the supervision of a registered
pharmacist in University Hospital or Grant Hospital.
Latolias, Shoup, and Anderson.

520 (509) P 4
Pharmaceutical Marketing
Sp. 3 75-min. cl.
Prereq.: Econ. 201.
A study of the pharmaceutical industry and the
distribution of drug products and pharmaceutical
services. Knapp and Rodowskas.

523 P 3
Pharmaceutical Record Keeping,
Information Systems, and Control
A. 3 cl.
Prereq.: Econ. 201.
Deals with the professional and business records
used in pharmacy practice; emphasis on the
understanding of principles through case studies.
Rodowskas.

524 (512) P 4
Pharmacy Management
W. 3 cl., 1 2-hr. lab.
Prereq.: 520 and 523 or Acc 201.
A study of fundamental problems associated with
planning, organizing, and controlling a community
pharmacy emphasizing case problems to illustrate
the practical application of management principles.
Rodowskas and Knapp.

525 (513) P 3
Pharmacy Management
Sp. 2 cl., 1 2-hr. lab.
Prereq.: 524.

553 (717) P 3
Microscopical Pharmacognosy
W, Sp. 3 2-hr. lab.
Prereq.: 451 or equiv.
A course embodying the principles of the microscope
and the application of microchemical and specialized
techniques in the detection, separation and
identification of drugs. Beal. Fee.

577 (602) P 3
Biological Products
W. 3 cl.
Prereq.: Microbiol. 509.
U.S.P. standards and legal requirements governing
manufacture, standardization, storage and distribution
of toxins, antitoxins, serums, and vaccines. Tye,
Nelson, and Wolf.

600 P 3
Prescription Accessories and Surgical Appliances
A, W. 3 cl.
Prereq.: Senior standing.
A presentation of background, variety, proper use
and general information with regard to surgical
supplies, appliances and prescription accessories.
Guth and Bopp.

601 P 3
Cosmetology
A, W, Sp. 1 cl., 2 2-hr. lab.
Prereq.: Senior standing or permission of instructor.
A study of the physical, chemical and physiological
aspects of materials and products comprising the
area of cosmetics with particular emphasis on
allergenic properties and formulations. Guth.

606 P 5
Pharmaceutics VI
A. 1 cl., 2 2-hr. lab.
Prereq.: 505.
A continuation of 505 with emphasis on the physical
chemical properties of drugs and dosage forms and
the nature and intensity of biological action. Notari,
Reuning, Anderson, Berry, Roberts, and Sherrin. Fee.

609 (647) P 3
The Pharmacy of Metabolic Agents
Sp. 3 cl.
Prereq.: Senior standing.
A study of the Pharmacy of medicinal products used
in the treatment of deficiency diseases, malnutrition,
and convalescence. Guth.
610 Professional Practice I
W. 3 2-hr. cl.
Prereq.: 605 and 679.
A clinical practice course designed to place the student in situations of the sort arising in professional community, hospital and nursing home practice. Salisbury, Berry, and Roberts.

611 Professional Practice II
Sp. 3 2-hr. cl.
Prereq.: 606 and 679.
A continuation of 610. Salisbury, Berry, and Sherrin.

613 New and Non-Official Drugs
Sp. 3 cl.
Prereq.: Senior standing.
The pharmacy of the more commonly used new and non-official medicinals. Nelson.

614 Professional Ethics
Sp. 1 2-hr. cl.
Prereq.: 512 or permission of instructor.
The conceptual basis and content of pharmaceutical ethics; significance of codified ethics, interprofessionally considered; differences of view underlying ethical issues; methods of encouraging compliance. Buerki, Knapp, and Rodowskas.

615 Sterile Products
W. 2 cl., 1 3-hr. lab.
Prereq.: 504 or equiv.
Formulation, preparation, and testing of sterile products including injections, bulk solutions, and nasal and ophthalmic preparations. Shoup and Latolaia. Fee.

625 Pharmaceutical Jurisprudence
Sp. 3 cl.
A study of the laws and regulations relating to the practice of pharmacy with emphasis on cases and court decisions illustrating the pharmacist's responsibilities. Salisbury and Rodowskas.

670 Chemical Pharmacology I
A. 5 cl., 1 3-hr. lab.
Prereq.: 433, 435, and 475.
An interdisciplinary approach to the fundamental chemical and pharmacological principles of drugs relative to their biochemistry, absorption, metabolic fate, pharmacodynamics and therapeutic applications. LaPidis, Miller, Witiaik, Burkman, Tye, and Wolf. Fee.

673 Chemical Pharmacology II
W. 5 cl., 1 3-hr. lab.
A continuation of 670, LaPidis, Miller, Witiaik, Burkman, Feller, and Gerald.

676 Chemical Pharmacology III
Sp. 5 cl., 1 2-hr. lab.
Prereq.: 673.

677 Toxicology
Sp. 3 cl.
Prereq.: 676 or permission of instructor.
Fundamentals of toxicology, including a discussion of the general classes of poisons, their physiological action, methods of treatment and detection with special emphasis on doses. Nelson and Burkman.

679 Chemical Pharmacology IV
A. 5 cl., 1 3-hr. lab.
Prereq.: 676.
A continuation of 676. LaPidis, Miller, Witiaik, Nelson, Patil, and Tye.

680 Pharmacology of Newer Products
W. 3 cl.
Prereq.: 679.
Pharmacology of the more recent drugs and preparations and their therapeutic application. Nelson.

693 Individual Studies in the Pharmaceutical Sciences
Prereq.: Junior standing, cumulative point-hour ratio of 2.5, and permission of instructor.
Repeatable to a maximum of 9 cr. hrs.
Laboratory and library work designed to give the qualified student an opportunity to complete an original investigation or pursuue an interest in a special problem.

695 Seminar
A, W, Sp. 2 cl.
Prereq.: Senior standing or permission of instructor.
Repeatable to a maximum of 6 cr. hrs.
Problems arising out of professional relations of the pharmacist with the physician, medical interns, nurses, laboratory technicians, and the laity.

700 Radioisotope Tracer Techniques and Radiopharmaceuticals
A. 3 cl., 2 3-hr. lab.
Prereq.: Permission of instructor.
A survey of the properties of radioisotopes and radiation; radioisotope tracer methods and applications to pharmaceutical sciences; the preparation, standardization, and handling of radiopharmaceuticals. Malpeis and Feller. Fee.
715 P G 3
Hospital Pharmacy and the Hospital Organization
A. 3 cl.
Prereq.: Senior standing, 515 or equiv., and permission of instructor.
Hospital organization and the relationship of the departmental components to the pharmacy. Latiolais and Visconti.

717 P G 3
Drug Therapy in Clinical Practice
A, W, Sp. 1 cl., 6 lab. hrs.
Prereq.: 679 and permission of instructor.
Repeatable to a maximum of 6 cr. hrs.
A clinical clerkship involving didactic, seminar, and clinical instruction in patient drug therapy using facilities of hospitals and clinics. Visconti, Cardoni, Huffman, Pontones, and Tschampel.

725 P G 3
Advanced Pharmaceutical Marketing
W. 3 cl.
Prereq.: 520, and Bus. Admin. 650 or equiv.
Theoretical aspects of drug marketing with emphasis on policies and practices of the pharmaceutical manufacturer. Knapp and Rodowskas.

737 (712) P G 5
Advanced Pharmaceutical Analysis
Sp. 3 cl., 2 3-hr. lab.
Prereq.: 432 or permission of instructor.
The use of specialized instruments in the assay and control methods of drugs and drug preparations. Olson. Fee.

754 (718) P G 3
Microscopical Pharmacognosy
Sp. 1 cl., 2 2-hr. lab.
Prereq.: 553 or equiv.
Pharmaceutical applications of specialized microscopic instruments. Beal.

789 (730) P G 5
Isolation Techniques in Research
W. 3 cl., 2 3-hr. lab.
Prereq.: Chem. 232 or permission of instructor.
A study and application of selected isolation techniques for the purification of natural products or other organic mixtures. Doskelich.

805 G 3
Technology
W. 1 cl., 2 3-hr. lab.
Prereq.: 606 or equiv.
Principles and practice in processing pharmaceutical dosage forms by the use of machines; emphasis is on fundamentals of unit processes in pharmaceutical manufacture. Guth. Fee.

806 G 2-3
Advanced Technology
Sp. 6-9 hrs, lab.
Prereq.: 606 or equiv.
Repeatable to a maximum of 9 cr. hrs.
A laboratory course designed to permit study of a variety of problems in pharmaceutical production, with the ultimate aim of pilot plant scale production. Guth. Fee.

809 G 3
Product Development
Su. 1 cl., 2 3-hr. lab.
Prereq.: 606 or equiv.
Study of problems involved in formulation of suitable dosage forms and the relationship of physical, chemical, therapeutic, and pharmacologic properties of medicaments to principles of formulation. Guth. Fee.

811 G 3
Advanced Pharmacy
A. 3 cl.
Prereq.: Chem. 521 or 533, and permission of instructor.
A study of the application of physical chemical principles to the design and development of fluid pharmaceutical dosage forms. Sokoloski, Maitseis, Notari, and Reuning.

812 G 3
Advanced Pharmacy
Sp. 3 cl.
Prereq.: Chem. 521 or 533, and permission of instructor.
A study of the methods used to predict determine, and improve the stability characteristics of medicinal agents in dosage form. Sokoloski, Maitseis, Notari, and Reuning.

816 (807) G 3
Principles of Hospital Pharmacy
W. 3 cl.
Prereq.: 715.
Administrative and professional principles and concepts of, and trends affecting, hospital pharmacy. Latiolais, Visconti, and Shoup.

817 (808) G 3
Principles of Hospital Pharmacy
Sp. 3 cl.
Prereq.: 816.
A continuation of 816. Latiolais, Visconti, and Shoup.

826 G 3
Advanced Pharmacy Administration
Su, A. 3 cl.
Prereq.: 725, and Bus. Admin. 500 or equiv.
Repeatable to a maximum of 6 cr. hrs.
Investigation and analysis of selected areas of pharmacy administration for group discussion and written report; case problems, review of current literature, and research. Knapp and Rodowskas.

835 G 3
Advanced Medicinal Chemistry
A. 3 cl.
Prereq.: 679 or equiv., and Chem. 813, or permission of instructor.
Chemistry of autonomic receptor sites; recent literature references on the biological, chemical, and stereochemical requirements for adrenergic and cholinergic stimulation and blockade. LaPides, Witlak, and Miller.
A study of the more important classes of constituents obtained from plants, including methods of isolation, purification, and identification. Mitscher, Doskotch, and Beal.

870  G 3
Theories in Pharmacology
A. 3 cl.
Prereq.: 679 or equiv.
Orientation to graduate pharmacology; an introduction into theories of pharmacology and the research approach in pharmacology. Nelson, Tye, Wolf, Burkhman, Patil, Feller, and Gerald.

871  G 3
Screening Methods in Pharmacology
W. 1 cl., 2 3-hr. lab.
Prereq.: 870 or equiv., Genetics 650 or equiv., and permission of instructor.
Qualitative pharmacology covering the standard laboratory procedures and methods used in routine screening and laboratory evaluation of new drugs. Wolf.
Fee.

872  G 3
Advanced Methods in Pharmacology
Sp. 1 cl., 2 3-hr. lab.
Prereq.: 871 and permission of instructor.
Theory and techniques involving spinal cat, tissue denervation, perfused heart aortic strips, calculation of pA2 and pD2, receptor protection experiments; biogenic amine fluorescence microscopy, etc. Patil.
Fee.

880*  G 3
Biological Standardization
Su. 1 cl., 2 3-hr. lab.
Prereq.: 871 and permission of instructor.
Quantitative pharmacology covering principles of bioassay design and interpretation; laboratory consists of the performance of standard bioassays. Tye and Nelson.
Fee.

881*  G 3
Advanced Topics in Pharmacology
W. 3 cl.
Prereq.: 871 and permission of instructor.
A study of current advanced theories of pharmacodynamics.

993  (830)  G 1-5
Individual Studies in the Pharmaceutical Sciences
Repeatable to a maximum of 15 cr. hrs.
Individual investigation of problems in one of the areas below:
  a. Pharmacy and Pharmaceutics.
  b. Pharmacy Administration and Social Sciences in Pharmacy.
  c. Hospital Pharmacy.
  d. Medicinal and Pharmaceutical Chemistry.
  e. Pharmacognosy and Natural Products Chemistry.
  f. Pharmacology.

999  (950)  G Arr.
Research in the Pharmaceutical Sciences
Research for thesis or dissertation purposes only.
Philosophy

Office: 10 University Hall, 216 North Oval Drive

Professors Turnbull (Chairman), Boe, Evans (Emeritus), Fox, Hinshaw, and Nelson; Associate Professors Garner, Hausman, Kielkopf, Oldenquist, Olscheks, Reither (Emeritus), and Rosen; Assistant Professors Anderson, Brown, Machamer, Pappas, and Robinson; Instructor Boer.

100 (400) U 3
Types of Philosophy
Not open to students with credit for 101.
Essentials of the various types of philosophy, such as idealism, materialism, dualism, and skepticism.

101 (401) U 5
Introduction to Philosophy
Not open to students with credit for 100.
Examination of major problems, such as the nature of reality, knowledge, truth, morality, and of the relation of philosophy to science and religion.

130 (405) U 5
Introduction to Ethics
The nature of right and wrong, good and evil; the grounds of moral choice and decision; the resolution of moral conflicts.

150 (402) U 5
Introduction to Logic
Deduction and induction; principles of clear statement and valid reasoning; fallacies; and the methods by which theories and laws are established.

210 (520) U 5
Philosophical Bases of Western Culture
Prereq.: Sophomore standing.
Not open to students with credit for (551) or (552).
Elucidation of major philosophical themes and their humanistic and scientific roles in western thought through the writings of Plato, Lucretius, Augustine, Descartes, Kant, and Nietzsche.

230 (510) U 5
Political and Social Philosophy
A.
Philosophical bases of social and political institutions and practices; analysis of such fundamental conceptions as rights, justice, equality, political obligation, and civil disobedience.

240 (515) U 5
Esthetics
Su, A, Sp.
Principal systems of esthetics; interpretation of the creative activity of the artist, the work of art, and the contemplation and criticism of art objects.

250 U 5
Symbolic Logic
A, W, Sp. 5 cl.
A formal presentation of the elements of modern and classical deductive logic; decision and proof procedures in sentential logic, functional logic, and Aristotelian logic.

270 U 3
Introduction to Philosophy of Religion
A.
Not open to students with credit for 170 or (406).
A philosophical analysis of the nature of religion and the foundations of religious belief.

511 (601) U G 5
History of Ancient and Medieval Philosophy
A.
Not for graduate credit to students majoring in Philos.

512 (602) U G 5
History of Philosophy from Bacon to Hume
W.
Not for graduate credit to students majoring in Philos.

513 (603) U G 5
History of Philosophy from Kant Through the 19th Century
Sp.
Not for graduate credit to students majoring in Philos.

520+ U G 3
American Philosophy
Sp.
Not open to students with credit for 61 or (607).
The development of American philosophy; puritanism, deism, transcendentalism, and pragmatism.

GENERAL PREREQUISITES FOR COURSES NUMBERED 600 and 700
Not open to freshmen or sophomores. Unless otherwise indicated the prerequisites for 600 and 700-level courses are 10 hours in philosophy.

611 (604) U G 5
Contemporary Philosophy
W.
Not open to students with credit for 605.
Examination of the doctrines of such philosophers as Bergson, Santayana, Whitehead, Russell, and Dewey.

615++ (642) U G 3
Philosophy of James and Dewey
Su, Sp.
Rosen.

617 U G 3
Existentialism
A.
Not open to students with credit for 605.
Introduction to the major doctrines of existentialism through writings of representative existentialists, such as Kierkegaard, Sartre, Jaspers, and Heidegger.
631 (671) U G 5
Advanced Ethical Theory
W.
Prereq.: 130.
An intensive examination of representative ethical systems such as egoism, hedonism, intuitionism, and utilitarianism.

641 U G 3
Advanced Esthetic Theory
W.
Prereq.: 240.
An intensive examination of representative aesthetic systems such as imitationalism, expressionism, formalism, and emotionalism.

650 (649) U G 3
Advanced Symbolic Logic
A.
Prereq.: 250.
Advanced techniques in functional logic and proof procedures; the axiomatization of sentential logic and the lower functional calculus; introduction to the higher functional calculus.

653 U G 3
Inductive Logic and Probability
Sp.
Prereq.: 109 or permission of instructor.
Analysis of types of empirical inference; natural law and confirmation theory; calculus and nature of probability; philosophic presuppositions of inductive inference.

668 U G 3
Philosophy of Law
A.
3 cr.
An examination of the nature and function of law and of such problems as the relation of law to morality and the justification of punishment.

671* (665) U G 3
Philosophy of History
A.
An essay of representative speculative theories of history; analysis of critical problems arising in the pursuit of historical knowledge.

672 (618) U G 5
Philosophy in Literature
W.
Philosophical problems as reflected in classics of literature, such as the Greek dramatists, Shakespeare, Voltaire, T. S. Eliot, Proust, and Tolstoy.

673 (666) U G 3
Philosophy of Language
W.
Prereq.: 150, or permission of instructor.
Semantics and language analysis; functions of language; modes of meaning, relation of linguistic structure to metaphysics.

674+ U G 3
Philosophy of Mathematics
W.
Prereq.: 681.
Analysis of the concepts of mathematical truth, knowledge, and objects; especial consideration of the theorems of Godel, Tarski, and Church.

675+ (653) U G 5
Philosophy of Religion
W.
A study of religious concepts and problems; the idea and nature of God, of man, their relation to the world and human destiny.

676 (652) U G 3
Philosophy of Science
A.
A study of the nature and structure of scientific concepts, laws, and theories; appraisal of methodologies, presuppositions, and frames of reference in science.

677+* (654) U G 3
Conceptions and Methods of the Social Sciences
Sp.
Philosophic assumptions of social science: nature of explanation (methodological individualism, holism, functionalism); methods in natural and behavioral science; fact and value in social inquiry.

693 (701) U G 2-10
Individual Studies in Philosophy
Prereq.: Permission of department chairman.
Students ordinarily earn from 2 to 3 cr. hrs., but honor students may earn up to 10 cr. hrs.

712+ (638) U G 5
Philosophy of Plato
A.
Prereq.: 10 cr. hrs. of Philos. including 511.

713+ (639) U G 5
Philosophy of Aristotle
Sp.
Prereq.: 10 cr. hrs. of Philos. including 511.

714* (609) U G 5
Medieval Philosophy
Sp.
Prereq.: 10 cr. hrs. of Philos. including 511, or 712 and 713.
An examination of the main trends in the thought of the middle ages, based on a study of characteristic works of some of the most important medieval philosophers.

7151+ U G 3
Selected Topics in Medieval Philosophy
Sp.
Prereq.: 10 cr. hrs. in Philos. including 511.
Not open to students with credit for 714.
Repeatable to a maximum of 21 cr. hrs.
717 (635) U G 3
Philosophy of Descartes
A.
Prereq.: 10 cr. hrs. of Philos. including 512.

718 (633) U G 3
Philosophy of Locke and Berkeley
W.
Prereq.: 10 cr. hrs. of Philos. including 512.

719† (636) U G 3
Philosophy of Spinoza
Sp.
Prereq.: 10 cr. hrs. of Philos. including 512.

720 (637) U G 3
Philosophy of Leibniz
A.
Prereq.: 10 cr. hrs. of Philos. including 512.

721 (534) U G 3
Philosophy of Hume
W.
Prereq.: 10 cr. hrs. of Philos. including 512.

722 (646) U G 5
Kant: Critique of Pure Reason
Sp.
Prereq.: 10 cr. hrs. of Philos. including 513.

723† (647) U G 5
Kant: Critique of Practical Reason and Critique of Judgment
Sp.
Prereq.: 722.

724† (640) U G 3
Post-Kantian German Idealism
Sp.
Prereq.: 10 cr. hrs. of Philos. including 513.
German philosophy as presented in writings of such thinkers as Fichte, Schelling, Hegel, and Schopenhauer.

725†(641) U G 5
History of Logic
W.
Prereq.: 651 or permission of instructor.
A history of logic from ancient Greek times to the present.

730 (UG 3
Advanced Logical Theory
W, Sp. 3 cr.
Prereq.: 250 and 650.
Repeatable to a maximum of 15 cr. hrs.
Topics include Gödel’s incompleteness and completeness proofs, Church’s theorem, Russell’s theories of description, relations, classes arithmetic, logical truth, logical paradoxes; topics vary yearly.

760 (661) U G 3
Theory of Knowledge I
W.
Prereq.: 650 or 651, or permission of instructor.
A study of major epistemological problems: the possibility, origin, foundation, structure, methods, limits, types, and validity of knowledge.

761†(U G 3
Theory of Knowledge II
Sp.
Prereq.: 760 or permission of instructor.
An intensive study of a systematic epistemological treatise, such as Bishop’s ‘Nature of Thought’, Lewis’ Mind and the World Order, or Lovejoy’s ‘Revolt Against Dualism’.

763 (663) U G 3
Problems in Metaphysics I
A.
Prereq.: 650 and permission of instructor.
Philosophic methods and nature of metaphysics; categories; substance and process; causality and law.

764† (664) U G 3
Problems in Metaphysics II
W.
Prereq.: 763 or permission of instructor.
Metaphysical presuppositions of knowledge; problems of universals; monism and pluralism; space and time.

767 (657) U G 3
Philosophy of Mind
W.
Classical and contemporary approaches to the nature of mind, mind-body, other minds, intentionality, and other problems.

770 (720) U G 3
Advanced Studies in Philosophy
Su, A, Sp.
Prereq.: Permission of instructor.
Repeatable to a maximum of 21 cr. hrs.

771 U G 3
Selected Topics in Analytic Philosophy
Prereq.: 150 and 611.
Repeatable to a maximum of 21 cr. hrs.

GENERAL PREREQUISITES FOR COURSES NUMBERED 800 AND 900
Unless otherwise indicated the prerequisites for 800 and 900-level courses are acceptable foundation courses either in general philosophy, logic and ethics, or history of philosophy, and in some cases in all these subjects.

811 (825) G 3
Seminar in the History of Philosophy
A.
Repeatable to a maximum of 9 cr. hrs.
PHILOSOPHY

831  (824)  G 3
Seminar in Ethics and Theory of Value
W.
Repeatable to a maximum of 9 cr. hrs.

841†  (827)  G 3
Seminar in Aesthetics
Sp.
Repeatable to a maximum of 9 cr. hrs.

850†  (821)  G 3
Seminar in Logic
W.
Repeatable to a maximum of 9 cr. hrs.

853†  (830)  G 3
Seminar in Induction and Probability Theory
Sp.
Repeatable to a maximum of 9 cr. hrs.

861  (823)  G 3
Seminar in Theory of Knowledge
W.
Repeatable to a maximum of 9 cr. hrs.

864  (822)  G 3
Seminar in Metaphysics
Sp.
Repeatable to a maximum of 9 cr. hrs.
Nelson.

870†  (828)  G 3
Seminar in Philosophy of Mathematics
Sp.
Repeatable to a maximum of 9 cr. hrs.

871  G 3
Seminar in Philosophy of Logic
A.
Prereq.: 651 or permission of instructor.
Differing views on the nature of logical inference and
logical truth.

875†  (807)  G 3
Seminar in the Philosophy of Religion
W.
Repeatable to a maximum of 9 cr. hrs.

877†  (829)  G 3
Seminar in Philosophy of Science
W.
Repeatable to a maximum of 9 cr. hrs.

885  (826)  G 3
Seminar in Philosophical Analysis
Sp.
Repeatable to a maximum of 21 cr. hrs.

999  (950)  G Arr.
Research in Philosophy
Research for thesis or dissertation purposes only.

Photography and Cinema
Office: 204 Haskett Hall, 150 West 19th Avenue.
Professors Wagner (Chairman) and Davis (Emeritus);
Associate Professors Binay, Craig, and Sanderson;
Assistant Professors Ball, Elgabri, and Platt; Instructors.

201  (511)  U 3
Photography
Su, A, W, Sp.  2 cl., 2 2-hr. lab.
Fundamentals of photography, including cameras,
emulsion characteristics, processing, filters, chemistry,
and optics. Craig, Dilley, and Vibberts. Fee.
a. For students in all curricula except Journalism,
Television Communication, Art, and Graphic Design.
b. For students in Art and Graphic Design.
c. For students in Journalism and Television
Communication.

502  U 3
The History and Theory of Photography
Su, A, Sp.  3 1-hr. cl. and lab.
Prereq.: Grad. or 4th yr. standing.
Study of the history of photography and its
contribution to the arts and sciences; the critical and
esthetic considerations of the photographic image.
Craig. Fee.

503  U 3
The History and Criticism of Motion Pictures
Su, W.  2 2-hr. cl. and lab.
Prereq.: Grad. or 4th yr. standing.
History of the motion picture and critique at the
contextual, artistic, technical, and information levels;
evaluative study of selected films. Schuth. Fee.

505  (605)  U 3
Theory of the Moving Image
A, Sp.  2 2-hr. cl.
Prereq.: Grad. or 4th yr. standing and permission of
instructor.
Study of the development of the film theory and its
relation to the other arts; aesthetic of the medium and
the modes of film communication as created, viewed,
and analyzed. Schuth. Fee.

506  (603)  U 3
Photographic Communications
A, W, Sp.  2 2-hr. cl.
Prereq.: Grad. or 4th yr. standing and permission of
instructor.
Study of the photographic image in relation to
communication theory; development of photographic
and motion picture systems in educational and
information programs. Sanderson and Wagner. Fee.
Advanced Photography I
Su, W, Sp. 2 cr., 2 hr. lab.
Prereq.: 201 or 594 or permission of instructor.
Not open to students with credit for 501.
Advanced techniques related to specific topics with emphasis on creative photography. Dilley and Vibberts. Fee.

Advanced Photography II
A, 2 cr., 2 hr. lab.
Prereq.: 501 or 521.
Continuation of 501 or 521; emphasis on photographic theory. Dilley and Vibberts. Fee.

Color Photography I
A, 2 cr., 2 hr. lab.
Prereq.: 501 or 521.
Principles of color photography including color theory, lighting, and recent color processes. Craig and Vibberts. Fee.

Color Photography II
W, 2 cr., 2 hr. lab.
Prereq.: 531.
Continuation of 531 with emphasis on color printing; consideration of the relationship of color theory and problems to motion pictures, television, and other creative and technical media. Craig and Vibberts. Fee.

Motion Picture Production I
Su, A, W, Sp. 2 hr. cl. and lab.
Principles and procedures in motion picture production including camera, metering, laboratory, editing, and projection systems; emphasis on the silent film as a form of visual expression. Elgabri and Schuth. Fee.

Motion Picture Production II
A, W, Sp. 2 hr. cl. and lab.
Prereq.: 551.
Intermediate motion picture production with emphasis on scripting, camera, and sound; examination of editorial process, relationships between film and television, and animation. Elgabri and Sanderson. Fee.

Motion Picture Production III
A, Sp. 2 hr. cl. and lab.
Prereq.: 552.
Not open to students with credit for 508.

Advanced motion picture production; emphasis on production planning and management, screen directing, color, widescreen, multiple-screen, and other contemporary forms. Elgabri and Sanderson. Fee.

Scientific Photography
Su, A, W, 2 cr., 2 hr. lab.
Prereq.: Science major, or 201 and 521.
For students in physical and biological science who need a knowledge of photography as an aid to their scientific work; application of photography to science. Binau.

Individual Studies in Photography
Su, A, W, Sp. 4-8 lab. hrs.
Prereq.: Grad. standing, 6 cr. hrs. in Photog. and Cinma. and permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Use of departmental facilities for adding to the student's knowledge of a specially selected photographic problem pertaining to his major field.

Group Studies in Photography
Prereq.: 15 cr. hrs. in Photog. and Cinma.
Repeatable to a maximum of 15 cr. hrs.
Specialized problems, processes, and theories in still and motion pictures designed for graduate students working on a minor in photography or cinema. Wagner and Staff.

Physical Education
Louis A. Hess, Director.
Office: 216 Physical Education Building, 337 W. 17th Avenue

Women's Physical Education
Office: 201, Pomerene Hall, 1760 Neil Avenue

Men's Physical Education
Office: 125 Physical Education Building, 337 W. 17th Avenue

Physical Education (Men)
Su, A, W, Sp. 2 cr.
Required of all freshman men; special sections for Phys. Ed. majors and minors.
Instructions in the techniques of play, rules, strategies, and the social behavior involved in sports and dance activities. Fee.
102  (402)  U 1
Physical Education (Men)
Required of all freshman men; special section for
Phys. Ed. majors and minors.
Continuation of 101.  Fee.

103  (403)  U 1
Physical Education (Men)
Required of all freshman men; special section for
Phys. Ed. majors and minors.
Continuation of 102.  Fee.

104  (421)  U 1
Physical Education (Women)
Required of all freshman women; special sections for
Phys. Ed. majors and minors.
Instructions in the techniques, rules, strategy, and
social behaviors of a sport or dance activity selected
by the student from a wide range of offerings.  Fee.

105  (422)  U 1
Physical Education (Women)
Required of all freshman women; special sections for
Phys. Ed. majors and minors.
Continuation of 104.  Fee.

106  (423)  U 1
Physical Education (Women)
Required of all freshman women; special sections for
Phys. Ed. majors and minors.
Continuation of 105.  Fee.

107  (425)  U 1
Physical Education
Su, A, W, Sp.  2 lab. hrs.
Not open to Phys. Ed. majors.
Cannot be repeated for credit.
Fee.
   a.  Men.
   A continuation of 103.
   b.  Women.
   A continuation of 106.

108  (426)  U 1
Physical Education
Su, A, W, Sp.  2 lab. hrs.
Continuation of 107.  Fee.
   a.  Men.
   b.  Women.

109  (427)  U 1
Physical Education
Su, A, W, Sp.  2 lab. hrs.
Continuation of 108.  Fee.
   a.  Men.
   b.  Women.

131  (411)  U 2
Physical Education Activities
A.  5 2-hr. labs.
Prereq.: Permission of chairman.
Required of Phys. Ed. majors.
These courses aim to develop knowledge,
understandings, and skills in the basic activities
appropriate to the teacher of physical education.
   a.  Men.
   b.  Women.

132  (412)  U 2
Physical Education Activities
W.  5 2-hr. labs.
Prereq.: Permission of chairman.
Required of Phys. Ed. majors.
Continuation of 131.
   a.  Men.
   b.  Women.

208  U 2
Orientation to Physical Education
A, W.  2 cl.
The scope of physical education; consideration of the
areas of concentration; teaching, research, recreation,
coaching, etc.; investigation of relationships to other
disciplines. Wardwell and Staff.

221  U 2
Sports Officiating
2 cl., 2 lab. hrs.
Prereq.: Satisfactory evidence of playing skill in the
selected athletic sport.
Repeatable to a maximum of 6 cr. hrs., subdivision not
repeatable.
Study of playing rules, rule interpretation, techniques
and mechanics of officiating various interscholastic and
intercollegiate athletic sports.
   221.01  Baseball
   Sp.
   221.02  Basketball
   A, W.
   Not open to students with credit for 222.
   (Students completing the course are eligible for
certification to officiate in Ohio Schools.)
   221.04  Football
   A.
   Not open to students with credit for 221.
   (Students completing the course are eligible for
certification to officiate in Ohio schools.)
   221.05  Gymnastics
   W.
   221.12  Wrestling
   Sp.
   (Students completing the course are eligible for
certification to officiate in Ohio schools.)
230 U 5
Nature of Human Movement
A, W, Sp. 2 hr-cl., 1 2-hr. lab.
The study of human movement, including its organization, significance and cultural implications. Allenbaugh and Staff.

231 (414) U 1
Physical Education Activities
A. 3 1-hr. labs.
Required of Phys. Ed. majors.
Cannot be repeated for credit.
These courses aim to develop knowledge, understandings, and skills in the basic activities appropriate to the teacher of physical education.
   a. Men.
   b. Women.

232 (415) U 1
Physical Education Activities
W. 3 1-hr. labs.
Required of Phys. Ed. majors.
Cannot be repeated for credit.
Continuation of 231.
   a. Men.
   b. Women.

233 (416) U 1
Physical Education Activities
Sp. 3 1-hr. labs.
Required of Phys. Ed. majors.
Cannot be repeated for credit.
Continuation of 232.
   a. Men.
   b. Women.

236 U 3
Sport Notation
Sp. 2 cl., 1 2-hr. lab.
Theory and techniques of Lebanotation for the purpose of recording the movement in specialized sport skills. Lilly.

270 (482) U 2
Supervision of Playground and Community Recreation Activities
Sp. 2 2-hr. labs.
Programming of recreational activities relative to community conditions; overview of activities desirable for a broad, comprehensive program.

271 (550) U 3
Camp Counseling
A. 2 cl., 7-day Sept. workshop
Sp. 2 2-hr. cl.
Prereq.: Phys. Ed. major and minor students shall have completed the Sept. workshop immediately preceding the qtr. of enrollment.
(Spring qtr. section is open to all University students.) Investigation of the responsibilities and duties of the counselor in various types of camps; practical experience in basic craft skills.

289 (551) U 2
Directed Teaching Experience in Physical Education
Su, A, W, Sp. 4 hr-conf-lab.
Prereq.: Permission of departmental adviser.
Not open to students with 5 cr. hrs. for 589.
Repeatable to a maximum of 6 cr. hrs.
Opportunity is provided for assisting in the teaching of sport and dance activity classes.
   a. Men.
   b. Women.

323 (576) U 3
Creative Physical Education for Elementary Teachers
Su, A, W, Sp. 2 2-hr. labs.
Not open to students with credit for 541.
Theory of physical activities as a medium for creative self-expression; exploration of rhythmical individual and group activities and their relation to development of children. Allenbaugh and Staff.

360 (691) U 5
Kinesiology
A, W, Sp. 4 cl., 1 2-hr. lab.
Prereq.: Zool. 231, 232.
Not open to students with credit for 660.

414 U 5
The Science of Development Through Activity
A, W, Sp. 4 cl., 1 2-hr. lab.
Prereq.: 360, and Zool. 232.
Not open to students with credit for 214.
A systematic study of factors in human movement which affect the physiological development of the organism.

420 The Teaching of Athletic Sports
2 cl., 2 lab. hrs.
Prereq.: Satisfactory evidence of playing skill in the selected athletic sport.
Repeatable to a maximum of 9 cr. hrs.; subdivision not repeatable.
Study in the theory strategy and mechanics of coaching various interscholastic, intercollegiate athletic sports.

420.01 Baseball
   a. Men.
   b. Women.

420.02 Basketball
   a. Men.
   b. Women.

420.03 Fencing
   a. Men.
   b. Women.
420.04 Football
a. Men.
W. Not open to students with credit for 546.
420.05 Gymnastics
a. Men.
Sp.
b. Women.
A.
420.06 Golf
a.† Men.
A.
b.† Women.
Sp.
420.07 Lacrosse
a.† Men.
A.
b.† Women.
A.
420.08 Soccer
a.† Men.
Sp.
b.† Women.
Sp.
420.09 Swimming
a. Men.
Sp.
b. Women.
W. Not open to students with credit for 549.
420.10 Tennis
a.† Men.
A.
b.† Women.
A.
420.11 Track and Field
a. Men.
W.
b.† Women.
Sp.
Not open to students with credit for 544.
420.12 Wrestling
a.† Men.
A.
420.13 Ice Hockey
a. Men.
Sp.

430 U 2
Basic Movement
Sp. 1 cl., 1 2-hr. lab.
Prereq.: 230.
The study and practice of basic movement as a category of activity in the physical education instructional program. Logsdon.

441 U 5
Movement Behavior and the Perceptual-Learning Process
A, Sp. 3 2-hr. cl.
Prereq.: Recommended 360, Psychol. 230, and Zool. 232.
Study of movement behavior and the learning of complex perceptual-motor skills, neurological and perceptual bases, learning theory, mediating variables; emphasis on application to teaching. Allen and Staff.

460 U 5
Kinesiology for Dancers
Sp. 4 cl., 2 2-hr. lab.
Prereq.: 10 cr. hrs. in Biological Sciences.
Scientific study of dance movements, including analysis of joints; physiological basis of conditioning; common injuries; maturation and technical development; equilibrium; control of force and speed. Goodhartz.

530 (616) U 2
The Administration of Interschool Athletics
A, Sp. 2 cl.
An introductory course in athletic administration, including scheduling contests, records, eligibility, contest management, facilities and equipment, budgets and finance, public relations, and awards. Hixson.

540 U 5
Historical Foundations of American Physical Education
Sp. 5 cl.
An historical survey of the origins and development of modern physical education in America, including individual leaders and contributing factors. Bennett.

541 U 5
Physical Education for the Elementary School Child
A, Sp. 2 cl., 3 2-hr. labs.
Prereq.: 230, and Psychol. 230.
The study of content, program design and teaching techniques appropriate to the elementary school child. Logsdon and Hewlett.

594† U 2
Group Studies in Physical Education
A, W, Sp. 2 cl.
Prereq.: or concur.: Ed. 586 or Ed. 587.
Consideration of present and changing concepts of physical education.

594.03 Application of Science to Physical Education
A.

594.31 Elementary School Physical Education
Sp.

594.32 Secondary School Physical Education
A, Sp.

621 U G 5
Principles of Physical Education
A, W, Sp. 5 cl.
Prereq.: Major or minor in Phys. Ed., or permission of instructor.
Origins and nature of modern physical education as developmental experience and medium of education; contributions to organic growth, personal resources, and growth in social relationships.

630 (615) U G 2
Problems in Intramural Sports
Sp. 2 cl.
A critical analysis of intramural sports programs; problems of policy and administration of programs on the elementary, secondary and college levels will be studied. Beekman.
771 (555) U G 3
Public Recreation: Its Organization and Administration
Su, W. 3 cl.
Prereq.: Soc 465, or equiv.
Consideration of common patterns of organization of community recreation found in American cities, large and small, under municipal, school, and other auspices. Mand.

820† (601) G 3
Principles of Football Coaching and Management
Su. 3 cl.
Prereq.: Grad. standing, and coaching experience.
A course for advanced students of football considering the principles of various types of strategy; the designing of plays, methods of teaching and controlling players, and special problems of management. Hayes.

830 (816) G 3
Problems in Interscholastic and Intercollegiate Athletics
Su, W. 3 cl.
The relation of athletics to education; problems of athletic organization; eligibility; finance, current trends and developments in management and purpose; public relations. Hixson.

831 (845) G 3
Professional Preparation of Teachers in Physical and Health Education
Su, Sp. 3 cl.
Principles underlying professional preparation of teachers in physical and health education; curriculum construction; selection of candidates; supervised teaching; staff personnel; problems pertaining to professional students. Hess.

832 G 3
Human Movement Theory in Physical Education
Su, Sp. 3 cl.
A study of the several theoretical conceptions of human movement and their implications for physical education and dance. Kleinman.

840 G 3
Comparative Physical Education and International Sport
Su, Sp. 3 cl.
A survey of contemporary physical education in selected countries with some attention given to international competition in sports. Bennett.

841 (805) G 3
Physical Education in School and College
A. 3 cl.

842 (814) G 3
Seminar in the Role of Sports in Society
Su, Sp. 3 cl.
Prereq.: Soc 465, or equiv.
Study of the significance of sports in society; and examination of the extent to which sports contribute to human welfare. Mordy.

845 G 3
Statistics for Physical Education
Su, A. W. 3 cl.
Prereq.: 440, Math. 116, 121, or 125; and permission of instructor.
A study of techniques for interpreting research publications in the field, and of statistical procedures useful in analyzing data. Mathews.

850 (810) G 3
Survey of Research in Physical Education
Su, Sp. 3 cl.
Prereq.: 885, or equiv. Mathews.

851 G 3
Perception Learning and the Movement Experience
W. 2 1/4-hr. cl.
Prereq.: 441, elementary statistics, and permission of instructor.
The study of the theoretical aspects of perception-learning processes and their relationship to learning movement skills. Allen.

860 (823) G 5
Organic Science as Applied to Physical Education and Health Education
Sp.
A systematic study of the integration of chemistry, biology, anatomy, physiology to the fields of physical education and health education.

880 (826) G 3
Supervision of Physical and School Health Education
A. 3 cl.
A study of the responsibilities and functions of the supervisor in city, county, and state school systems. Hixson.

881 G 3
Areas and Facilities in Physical Education
Su, A. 3 cl.
Principles and techniques in determining facility needs, evaluating facilities, planning for new construction and remodeling the areas and facilities for physical education and recreation. Hess and Coates.

885 (825) G 3
Methods of Research in Health Education and Physical Education
Su, W, Sp. 3 cl.
To develop some competency in professional writing and in the use of various research methods applied to health education and physical education. Mathews.

994 (820) G 3
Problems in Physical Education
Advanced problems in physical education, individual or group participation.

994.01 Recreation
Su, A.
PHYSICAL MEDICINE

594.02 Adapted Physical Education
W.

594.07 Curriculum in Physical Education
Sp.

594.04 Physical Education in Higher Education
Su, A.

594.05 Physical Education in Secondary Education
Sp.

594.06 Physical Education in Elementary Education
W.

594.07 School Evaluation
Su, W.

594.08 Administration
A.

995 (802) G 2
Seminar in Physical Education
W. 2 cl.

996 (803) G 2
Seminar in Recreation
Sp. 2 cl.

999 (950) G Arr.
Research in Physical Education
Research for thesis or dissertation purposes only.

Physical Medicine

Office: 112 Dodd Hall, 472 West Eighth Avenue

Professor Johnson (Chairman), Nagi; Associate
Professor Gibson, Guyton, Hamilton, Melvin, Spiegel,
and Stow; Assistant Professor Checkles, Earl, Larson,
Ludwig, MacLean, Spitzker, Taylor, and Waylonis.

The Comprehensive Evaluation of the Patient
(See Med. 601, 602, and 603.)
[Offered in cooperation with the Dept. of Med., Ob.
Radio., and Surg.]
Interdisciplinary instruction and patient
demonstrations stressing deviations, muscular
weakness, electrodiagnosis, and total evaluation
of severely disabled patients of all ages.

715 P 1
Medical Rehabilitation
1 month, offered Oct. and Feb.
Prereq.: Med. 4th yr. standing.
Ambulation aids, electrodiagnosis, prosthetics, physical
and occupational therapy, social service, as related to
acute and chronic diseases, Johnson and Staff.

735 P 6, 12, 18
Clinical Physical Medicine and Rehabilitation
1, 2, or 3 months; offered all months.
Prereq.: Med 3rd or 4th yr. standing and permission of
instructor.
Ward experience in restorative procedures on
individuals with severe chronic disabilities. Guyton,
Melvin, Johnson, Spiegel, MacLean, Checkles, Waylonis,
and Earl.

736 P 3
Clinical and Physiologic Bases
of Physical Treatment
Su.
Prereq.: Permission of instructor.
The indications for, and choice of, physical modalities.
Stow, MacLean, and Checkles.

745 P 6, 12, 18
Biophysical Basis of Physical Treatment
1, 2, or 3 months; offered all months.
Prereq.: Med. 3rd or 4th yr. standing and permission
of instructor.
The student will design and complete a laboratory or
library research problem involving the biophysical
aspects of physical diagnosis or treatment. Johnson,
Stow, and Melvin.

750 P 3
The Natural History of Disability
A. 3 1-hr. cl.
Prereq.: Grad. or professional registration and
permission of instructor.
Analysis of the nature and patterns of disability, the
processes involved, and the factors influencing its
course. Nagi and Staff.

770 P 3
Instrumentation, Neurophysiology,
Clinical Aspects of Electromyography
W.
Prereq.: Resident standing and permission of dept.
chairman.
In-depth study of the instrumentation and correlation
of neurophysiology and clinical aspects of
electromyography, including excitable membranes,
biological potentials, and nerve stimulation in clinical
disorders. Johnson, Melvin, and Stow.

799 P 18
Residency in Physical Medicine
12 months full time, beginning July 1.
Prereq.: Appointment as Resident, University Hospital.
Repeatable to a maximum of 216 cr. hrs.
Rotation through physical medicine and rehabilitation
clinical inpatient and outpatient services; consultative,
supervisory, and teaching responsibilities in the
patient-care team; rounds, conferences, seminars.
Johnson, Guyton, Spiegel, Melvin, MacLean, Checkles,
and Waylonis.

993 (793) G 3-5
Individual Studies in Physical Medicine
Prereq.: Permission of instructor.
Minor investigations using electrodiagnostic techniques;
bioelectrical, physiologic, and therapeutic effects of
physical agents, and other medical rehabilitation
techniques. Johnson, Stow, Nagi, Melvin, and Taylor.

999 G Arr.
Research in Physical Medicine
Research for thesis purposes only.
Physical Therapy

(School of Allied Medical Professions)
Office: 209 Dodd Hall, 472 West Eighth Avenue
Associate Professor Woods (Division Director); Professor Johnson; Associate Professor Burnett; Assistant Professors Chase and Downer; Instructors Chidley, Kisner, Pierson, and Starks.

100 (500) U 2
Introduction to Physical Therapy
A. 2 cl.
A general orientation of physical therapy and its relation to medical services; medical ethics, medical terminology, personal relationships, institutional contracts, and patient management. Burnett.

480 U 3
Procedures I
A. 3 cl., 1 3-hr. lab.
Prereq.: Admission to Phys. Ther.
Not open to students with credit for 301 and 302.
Professional orientation: introduction to the hospital setting and patient care; principles and techniques of basic body mechanics; bandaging and therapeutic massage. Woods.

481 U 5
Procedures II
W. 4 cl., 2 2-hr. lab.
Prereq.: 480, or 301 and 302.
Not open to students with credit for 402 and 415.
Agents used in physical therapy: mechanical and physical properties; therapeutic application and physiological effects related to patients. Downer.

482 (503) U 3
Procedures III
Sp. 1 cl., 2 2-hr. lab.
Prereq.: 481, or 402 and 415 or admission to Oc. Ther.
Not open to students with credit for 301.
Evaluation techniques and their usage in physical therapy; posture evaluation, goniometric range of motion recordings, manual muscle testing, functional tests and measurements. Downer and Chidley.

495 (600) U 3
Medical Kinesiology
W. 2 cl., 1 2-hr. lab.
Prereq.: Admission to School of Allied Medical Professions and permission of instructor.
Not open to students with credit for 302 or 304.
Biomechanics and pathomechanics in the analysis of human motion; emphasis on hand function; gait deviations; correlation of lecture and laboratory material with case presentations. Burnett and Kisner.

499 (612) U 3
Selected Problems in Physical Therapy
Sp. 2 cl., 1 1-hr. lab.
Prereq.: 480.
Not open to students with credit for 400.
Survey and analysis of selected problems in administration and supervision; introduction to scientific research. Woods.

521 U 2
Medical Science I
A. 2 cl.
Prereq.: Admission to School of Allied Medical Professions.
Principles, clinical aspects, and therapeutic procedures related to selected medical specialties. Burnett.

522 U 2
Medical Science II
W. 2 cl.
Prereq.: Admission to School of Allied Medical Professions.
Lectures and clinical presentations giving an orientation to signs, symptoms, and therapeutic management of patients in related medical science fields. Chidley.

541 (610) U 3
Therapeutic Exercise I
A. 2 cl., 2 2-hr. lab.
Prereq.: Admission to Phys. Ther.
Not open to students with credit for 310.
Basic principles and techniques of therapeutic exercise. Kisner.

542 (607) U 5
Therapeutic Exercise II
W. 3 cl., 2 2-hr. lab.
Prereq.: 541 or 310.
Not open to students with credit for 407.
Rehabilitation procedures for total restoration of the disabled; fundamental relationships and principles associated with functional exercise. Pierson.

543 (605) U 4
Therapeutic Exercise III
Sp. 2 cl., 2 2-hr. lab.
Prereq.: 542 or 407.
Not open to students with credit for 405.
Theory and technique of exercise for the neurologically handicapped with carry-over into all areas of disability; integration and correlation of therapeutic exercise approaches. Chidley.

545 (615) U 3
Developmental Sequence and Aging
Sp. 3 cl.
Prereq.: 542 or 407.
Not open to students with credit for 415.
Adaptations and modifications of physical therapy in treatment of pediatric and geriatric patients; measurement of levels of physical fitness. Burnett and Chase.

585 (608) U 3
Physical Therapy Clinical Coordination
W. 1 cl., 2 2-hr. lab.
Prereq.: 542 or 407.
Not open to students with credit for 485.
Coordination and summary practice of all physical therapy procedures; being determined by the patient's diagnosis and medical prescription; treatment, records, charts, and methods of evaluating and reporting. Pierson.
Clinical Conference and Observation

Prereq.: Permission of instructor and completion of all major courses.
Not open to students with credit for 486.
Therapeutic problems arising from clinical practice in the field, and the observation of surgical procedures on patients most likely to receive physical therapy and rehabilitation, Woods and Staff.

Clinical Practice in Physical Therapy

Su, A, W, Sp. 5 8-hr. lab.
Prereq.: Permission of instructor and completion of all major courses.
Not open to students with credit for 487.
Clinical application of physical therapy techniques under supervision in physical therapy departments of affiliated hospitals; practice with assigned patients, Woods and Staff.

Seminar

Sp. 2 cl., 1 2-hr. lab.
Prereq.: Permission of instructor.
Not open to students with credit for 485.
Integration of theory and preclinical practice; clinical affiliation planning, Pierson.

Physics

Office: 1012 Alpheus Smith Laboratory of Physics, 174 West 18th Avenue

Professors Jossem (Chairman), Amr, Bell, Brown, Dickey, Edwards, Gaines, Heer, Jastrzem, Kortinga, Lande (Emeritus), Mills, Nelson, C. Nielsen, Koninga, Pool, Prebus, Rie, Romanow, Shaffer, Shaw, Tanaka, Wada, and Yaqub; Associate Professors Blatt, Donoghue, Erickson, Harris, Kim, Kuritov, (Emeritus), Mate, Mulligan, Plough, Reibel, Riley, (Emeritus), Mate, Mulligan, Plough, Reibel, Riley,

101  (401)  U 5  
Nature of the Physical World
A, Sp. 4 cl., 1 2-hr. lab.
An elementary description of the physical world emphasizing scientific method and contemporary viewpoints; laboratory work and demonstrations.

102  (402)  U 5  
Nature of the Physical World
W. 4 cl., 1 2-hr. lab.
Prereq.: 101.
Continuation of 101.

111  (411)  U 5  
General Physics: Mechanics and Heat
Su, A, W, Sp. 4 cl., 1 2-hr. lab.
Prereq.: Eligibility for math. 130.

112  (412)  U 5  
General Physics: Electricity, Magnetism, and Light
Su, A, W, Sp. 4 cl., 1 2-hr. lab.
Prereq.: 111.

113  (413)  U 5  
General Physics: Modern Physics
Su, A, W, Sp. 4 cl., 1 2-hr. lab.
Prereq.: 112.

131  U 5  
Introductory Physics: Particles, Motion
A, W, Sp. 5 cl., 1 2-hr. lab.
Prereq.: 1 entrance unit of Physics or Chem.; prereq. or concur. Math. 151.
Not open to students with credit for 431, (531) or 231.
A presentation of the major concepts of physics from a contemporary point of view, for students majoring in physical sciences, mathematics, or engineering.

132  U 5  
Introductory Physics: Waves, Quanta
A, W, Sp. 5 cl., 1 2-hr. lab.
Prereq.: 131 and Math. 151; prereq. or concur. Math. 152.
Not open to students with credit for 432, (532), or 232.
Continuation of 131.

133  U 5  
Introductory Physics: Particle Systems, Electrodynamics
A, W, Sp. 5 cl., 1 2-hr. lab.
Prereq.: 132 and Math. 152; prereq. or concur. Math. 153, or permission of instructor.
Not open to students with credit for 433, (533), or 233.
Continuation of 132.

241  U 3  
Physical Phenomena
A, Sp. 3 cl.
Prereq.: 133 or equiv.; Math. 153; prereq. or concur. Math. 254.
Not open to students with credit for 603, or 541.
A study of gases, liquids, and solids illustrating the connection between measurements (mechanical, macroscopic) and models (statistical, microscopic) of the properties of matter in bulk.

251  U 3  
Physical Phenomena
Su, W. 3 cl.
Prereq.: 133 or equiv.; Math. 153; prereq. or concur. Math. 254.
Not open to students with credit for (614), 551.
A study of selected topics in contemporary physics with emphasis on the design and interpretation of crucial experiments.
435 (505) U 3
Intermediate Geometrical Optics
W. 3 cl.
Not open to students with credit for 535.
Ray optics of thick lenses, mirrors, prisms, and their
combination; apertures and aberrations.

436 (506) U 3
Intermediate Physical Optics
Sp. 3 cl.
Not open to students with credit for 636.
Wave theory of optical phenomena; applications.

437 (535) U 2
Geometrical Optics Laboratory
W. 1 4-hr. lab.
Prereq. or conc.: 435 or 535.
Not open to students with credit for 635.
Selected experiments in geometrical optics.

438 (536) U 2
Physical Optics Laboratory
Sp. 1 4-hr. lab.
Prereq. or conc.: 436 or 536.
Not open to students with credit for 636.
Selected experiments in physical optics.

501 (645) U G 3
Descriptive Acoustics
A. 3 cl.
Prereq.: Junior standing in Music, Speech, or Science
Educ. Not open to Physics majors.
Descriptive non-mathematical treatment of acoustics
with applications to music and speech including
sources, propagation, reception, characteristics of
sound; room acoustics; hearing; apparatus.

503 (643) U G 5
General Meteorology
Sp. 4 cl., 1 2-hr. lab.
Prereq.: Either 111, 131, or permission of instructor.
Not open to students with credit for 129.
Study of atmospheric phenomena; individual
observation and prediction of weather events.

506 (641) U G 5
Basic Principles and Recent Advances
in Physics
Sp.
Prereq.: Academic Year Science Institute students only.
Primarily for high school physics teachers; a unified
treatment of concepts and principles of classical
physics together with selected topics in contemporary
physics.

507 (637) U G 3
Physics Seminar for In-Service Science Teachers
Su, A. 1 3-hr. cl.
Prereq.: 15 or hrs. of Physics and teaching experience;
permission of instructor.
A course to deepen teachers' understanding of basic
physical concepts and methods of treatment of
selected problems; presentation will include lectures,
discussions, demonstrations, and problem solving.

508 (638) U G 3
Physics Seminar for In-Service Science Teachers
Su, W. 1 3-hr. cl.
Prereq.: 507.
Continuation of 507.

509 (639) U G 3
Physics Seminar for In-Service Science Teachers
Su, Sp. 1 3-hr. cl.
Prereq.: 508.
Continuation of 508.

514† (634) U G 4
Fundamentals of Radioactivity
and Instrumentation
A. 3 lec., 1 3-hr. lab.
Prereq.: 2 qtrs. of college Physics or Chem, and 20 cr.
hrs. of Biological Sciences or permission of instructor.
Not open to students majoring in Chem., Engr., or
Physics.
Descriptive treatment of atomic and nuclear structure;
physical properties of radioactive nucliel;
instrumentation; radiation hazards and safety;
introduction to applications of radioactivity.

516 U G 3
Intermediate Physics Laboratory
Su, A, W, Sp. 2 3-hr. labs.
Prereq.: 112-113 or 122-123 or 222-233 and Math. 150.
Not open for grad. credit to students majoring in
Physics.
Repeatable to a maximum of 9 cr. hrs.
Selected intermediate level experiments from basic
areas of physics.

GENERAL PREREQUISITES FOR COURSES
NUMBERED 520 TO 599
Unless otherwise indicated, Physics 131-132-133 and
Math. 254, or equiv., not open for grad. credit to
Physics majors.

525 U G 4
Dynamical Models I
A. 4 cl.
Prereq.: 133 and Math. 255 or equiv.
Not open to students with credit for 601 and 521.
Dynamical models of particle motion; behavior of linear
systems; periodic and transient phenomena in
mechanical and electrical systems; central force
problems; frames of reference.
555   U G 4
Fields and Waves I
W. 4 cl.
Prereq.: 525 or equiv. Prereq. or concur. Math. 551.
Not open to students with credit for 608 and 531.
Introduction to the description of fields, gravitational and
electrostatic; dielectrics; boundary-value problems;
Green’s function.

580   U G 3
Topics in Physics
Su, A, W, Sp. 3 cl.
Prereq.: 525 or permission of instructor.
Introductory treatment of phenomena and elementary
theory of contemporary areas of physics.
580.01 Introduction to Modern Physics
Su, A, Sp.
Prereq.: 525 or permission of instructor.
Not open to students with credit for 472, 551, 614, or 705.
580.05 Introduction to Nuclear Physics
A, Sp.
Prereq.: 580.01.
Not open to students with credit for 571 or (615).
580.06 Electronic Physics
Sp.
Prereq.: 580.01.
Not open to students with credit for 661 or (610).
596.11 Physics of the Upper Atmosphere
A.
Prereq.: 580.01.
Not open to students with credit for 651 or (648).
598.20 Special Topics
Prereq.: 580.01.
Repeatable to a maximum of 9 cr. hrs.

593   U G 2-5
Individual Studies in Physics
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Independent reading, study, or laboratory work at an
intermediate level.

595   U 1
Seminar
Prereq.: 131, 139, 133, and Math. 254 or equiv.
Repeatable to a maximum of 6 cr. hrs.
Discussion of special topics with student participation in
the presentation of material.

616   U G 3
Advanced Physical Laboratory
Su, A, W, Sp. 2 3-hr. labs.
Prereq.: 251 or 525, 531 or 555 and one of 241, 541, 251, 531, or 271.
Repeatable to a maximum of 24 cr. hrs.
Experiments selected from all areas of physics; independent work emphasized.

625   U G 4
Dynamical Models II
W. 4 cl.
Prereq.: 525 or permission of instructor. Math 551.
Not open to students with credit for 726 or 621.
Continuation of 525 with development of generalized
coordinate representations and equations of motion;
kinetic models of a gas; rigid body motion; introduction to
linear transformations.

627   U G 4
Dynamical Models III
Sp. 4 cl.
Continuation of 625 with emphasis on systems of
particles; kinetic models of a gas; rigid body motion;
Introduction to linear transformations.

656   U G 4
Fields and Waves II
Sp. 4 cl.
Prereq.: 555 or equiv.
Continuation of 555; magnetic fields of steady currents;
induction; Maxwell’s equations; plane waves; special
relativity.

657   U G 4
Fields and Waves III
A. 4 cl.
Prereq.: 656 or equiv.
Not open to students with credit for 666 or 636.
Continuation of 655; plane waves in matter; physical
optics; coherence, interference, diffraction, and
dispersion.

693 (701)   U G 1-15
Individual Studies in Physics
Su, A, W.
Prereq.: Satisfactory advanced courses in experimental
and theoretical physics and permission of instructor.
Repeatable to a maximum of 30 cr. hrs.
A course designed to give a properly qualified student
opportunity for independent reading, study, or
laboratory work in a specialized field of interest.

694   U G 1-4
Group Studies
Prereq.: Satisfactory advanced courses in experimental
and theoretical physics and permission of instructor.
Repeatable to a maximum 15 cr. hrs.
Gives groups of students an opportunity to pursue
special studies not otherwise offered.

705   U G 4
Structure of Matter I
Su, A. 4 cl.
Prereq.: 251, 625, 656, or equiv. and Math. 255 and 551,
or equiv.
Not open to students with credit for 727.
Quantum phenomenology; Schrodinger formulation of
quantum mechanics; applications to simple systems;
one-electron atoms.
706 U G 4
Structure of Matter II
W. 4 cl.
Prereq.: 705 or equiv.
Not open to students with credit for 728.
Continuation of 705; magnetic moments and spin;
identical particles; many-electron atoms; molecular
structure and spectra.

707 U G 4
Structure of Matter III
Sp. 4 cl.
Prereq.: 706 or equiv.
Continuation of 706; quantum statistics; band theory
of solids; interaction of radiation with matter; nuclear
and elementary-particle physics.

735 (714) U G 3
Electromagnetic Theory of Light
Sp. 3 cl.
Prereq.: Permission of instructor.
Mathematical treatment of physical optics.

743 (703) U G 3
Thermodynamics
Su, A. 3 cl.
Prereq.: 241 and 627 or equiv.
Not open to students with credit for (803) or (804).
Modern treatment of topics in physical thermodynamics
including entropy, specific heats, third law, and
change of phase.

780 U G 3
Topics in Contemporary Physics
Su, A, W, Sp. 3 cl.
Prereq.: 705 or permission of instructor.
Experimental and theoretical aspects of areas of
current interest in physics.
780.01 Atomic Spectra and Structure
Not open to students with credit for 751 or (718).
780.02 Elementary Particles
Sp.
780.03 Low-Temperature Physics
Not open to students with credit for 744 or (704).
780.04 Molecular Spectra and Structure
W.
Not open to students with credit for 757 or (719).
780.05 Nuclear Physics
Sp.
Not open to students with credit for 771 or (721).
780.06 Solid State
Su.
Not open to students with credit for 761 or (716).
780.07 Plasma Physics
Not open to students with credit for 775 or (711).
780.09 X-ray Physics
Not open to students with credit for 753 or (720).
780.20 Special Topics

795 U G 1
Special Topics Seminar
A, W.
Prereq. or concur.: 705.
Repeatable to a maximum of 3 cr. hrs.
A survey of current research problems in physics.

801 (881) G 1
Seminar in Physics
Prereq.: Acceptable specialized courses and permission
of instructor.
Repeatable to a maximum of 20 cr. hrs.
Seminars will be conducted by various members
of the staff on topics of current interest in their
fields of specialization; students will participate
in the presentation and discussion of material.

816 G 3-6
Topics in Physics
Prereq.: 616 or equiv. and permission of instructor.
Repeatable to a maximum of 30 cr. hrs.
Laboratory and/or theoretical work on an individual
basis on topics of current interest.

821 (840) G 4
Advanced Dynamics I
A. 4 cl.
Prereq.: 626 or permission of instructor.
Generalized coordinates, Lagrange's equations,
variational principles, Hamilton's equations, canonical
transformations, Hamilton-Jacobi theory, and dynamics
of classical fields.

822 (841) G 4
Advanced Dynamics II
W. 4 cl.
Prereq.: 821.
Linear transformation theory, norma coordinates, small
oscillations; postulates and foundations of general
relativity, and gravitational field equations and
solutions.

827 (817) G 5
Quantum Mechanics I
A. 5 cl.
Prereq.: 706 or permission of instructor.
Systematic treatment of wave mechanics, including
symmetries and conservation laws, eigenvalues
and eigenvectors of linear operators, separation
of variables, soluble examples, first-order perturbation
theory, scattering.

828 (818) G 5
Quantum Mechanics II
W. 5 cl.
Prereq.: 827.
Continuation of 827; theory of measurement, linear
vector spaces and linear operators, transformations,
symmetries, addition of angular momenta, identical
particles.
829 (819) G 5
Quantum Mechanics III
Sp. 5 cl.
Prereq.: 828.
Continuation of 828; systematic treatment of approximation methods; perturbation expansions, variational principle, sudden and adiabatic approximations; applications to atomic systems, scattering problems, electromagnetic transitions.

830 G 4
Advanced Quantum Mechanics I
A. 4 cl.
Prereq.: 829, 836, and Math. 701 or equiv.
Systematic treatment of advanced topics in quantum mechanics; symmetry groups, angular momenta, systems of identical particles, complex systems.

831 G 4
Advanced Quantum Mechanics II
W. 4 cl.
Prereq.: 830.
Continuation of 830; collision theory, Dirac equation, field quantization.

834 (805) G 4
Electromagnetic Field Theory I
A. 4 cl.
Prereq.: 656 or equiv.
Static electric fields, static and stationary magnetic fields, dielectrics, magnetized bodies; boundary value problems, vector and scalar potential functions; and energy in electric and magnetic fields.

835 (806) G 4
Electromagnetic Field Theory II
W. 4 cl.
Prereq.: 834 or permission of instructor.
Maxwell's equations, gauge transformations; superposition, polarization, dispersion and refraction of plane electromagnetic waves; special relativity, covariant formulation of particles and fields, and conservation laws.

836 G 4
Electromagnetic Field Theory III
Sp. 4 cl.
Prereq.: 835 or permission of instructor.
Radiating systems and diffraction; London equations; radiation by moving charges, bremsstrahlung; multipole fields; radiation damping; and scattering and absorption of charged particles.

847 (824) G 3
Statistical Mechanics I
W. 3 cl.
Prereq.: 743, 707 or 828 or permission of instructor.
Advanced treatment of fundamentals of classical and quantum statistical mechanics with application to contemporary problems.

848 (825) G 3
Statistical Mechanics II
Sp. 3 cl.
Prereq.: 847.
Continuation of 847.

880 (860) G 3
Advanced Topics
A, W, Sp. 3 cl.
Prereq.: 828 or permission of instructor.
Repeatable to a maximum of 9 cr. hrs. in each decimal subdivision.
A systematic advanced treatment of areas of current interest in physics; topics will be announced each quarter.

880.01 (813) Atomic Spectra and Structure
880.02 (846) Elementary Particle Physics
880.03 Low-Temperature Physics
880.04 (851) Molecular Spectra and Structure
880.05 (830) Nuclear Physics
880.06 (833) Solid State
880.08 (843) Theory of Quantized Fields
880.20 Special Topics

999 (950) G Arr.
Research in Physics
Research for thesis or dissertation purposes only.

Physiological Chemistry

Office: 5170 Medical Basic Science Building, 370 West Ninth Avenue

Professors Cornwell (Chairman), Allen, Brierley, Frajola, Kruger, McCluer, Richardson, and Wilkoff (Emeritus);
Associate Professors Alben, Devor, Endahl, Gruemer, Meroia, Newman, Nuenke, Rieske, and Sprecher;
Assistant Professors Addianki, Boggs, Eyring, Horrocks, Knapper, Mathews, Mayer, Mokhjian, Och, and Stoner.

311
Physiological Chemistry
Prereq.: Chem. 102 or 122 and enrollment or intended enrollment in a program of the School of Allied Medical Professions.
Students may not receive credit for both 311.01 and 311.02.
Human biochemistry with emphasis on metabolism and applications to clinical chemistry and human nutrition; pertinent organic chemistry will be included; laboratory to illustrate general techniques with emphasis on food composition. Devor and Staff.

311.01 Lecture and Laboratory A 4 cl., 1 3-hr. lab.
Fee.

311.02 Lecture A 4 cl.

312
Physiological Chemistry
Students may not receive credit for both 312.01 and 312.02.
A continuation of 311.

312.01 Lecture and Laboratory W 4 cl., 1 3-hr. lab.
Prereq.: 311.01.
Fee.

312.02 Lecture W 4 cl.
Prereq.: 311.01 or 311.02.
Physiological Chemistry
Sp. 4 cl., 2 3-hr. lab.
Prereq.: Dent. 1st yr. standing, Chem. 231, and 232.
Chemistry of the carbohydrates, lipids, and proteins; biochemistry of digestion, absorption, metabolism, and excretion. Devor and Staff.

Physiological Chemistry (Human Nutrition)
A. 2 cl.
Prereq.: 540 and Dent. 1st yr. standing.
The elements of human nutrition with a special emphasis on the relation of diet to dentistry. Richardson.

Physiological Chemistry
A. 150 cl. and lab. hrs.
Prereq.: Med. 1st yr. standing or permission of instructor.
Chemistry of carbohydrates, lipids, and proteins; biochemistry of human digestion, nutrition, metabolism and excretion; correlations between normal human metabolism and the biochemistry and genetic control of disease processes. Cornell, Nuenke, and Staff.

Physiological Chemistry
W. 2 cl. hrs. and lab.
Continuation of 601; experimental studies in biochemical control mechanics in normal and pathological states including nutritional deficiencies. Cornell, Nuenke, and Staff.

Physiological Chemistry
Sp. 1 cl.
Prereq.: Med. 1st yr. standing and 602.
Special reading in physiological chemistry. Nuenke and Staff.

Physiological Chemistry
A. 3 cl.
Prereq.: Chem. 242, 244, or 253, 254 or equiv.; Physical Chem. background of Kinetics and Thermodynamics, or permission of instructor.
Not open to students with credit for Biochem. 601 or 605.
(Cross-listed in Biochemistry and Molecular Biology as Biochem. 705).
An intensive treatment of modern biochemistry; protein structure, enzyme catalyzed reactions, chemistry and metabolism of carbohydrates. Cornell, Serif, and Interdepartmental Staff.

Physiological Chemistry
A. 3 cl.
Prereq.: 601 or Biochem. 605.
Not open to students with credit for Biochem. 707.
(Cross-listed in Biochemistry and Molecular Biology as Biochem. 707).
An intensive treatment of modern biochemistry; energy utilization and electron transport, photosynthesis, membranes and lipid metabolism. Cornell, Serif, and Interdepartmental Staff.

Physiological Chemistry
Sp. 3 cl.
Prereq.: 707 or Biochem. 709.
Not open to students with credit for Biochem. 709.
(Cross-listed in Biochemistry and Molecular Biology as Biochem. 709).
An intensive treatment of modern biochemistry; intermediary metabolism of amino acids, proteins, and nucleic acids. Cornell, Serif, and Interdepartmental Staff.

Individual Studies in Physiological Chemistry
3 or 4 months; offered all months.
Prereq.: 602, 612 or equiv. and permission of instructor.
Repeatable to a maximum of 15 cr. hrs. for grad credit; must repeat to 18 or 24 cr. hrs. for professional credit.
Qualified students may avail themselves of the facilities of the department for conducting a minor investigation under the direction of a senior staff member.
Advanced Physiological Chemistry
A. 3 cl.
Prereq.: 602 or 612 or equiv., Chem. 831, 832, 833 or permission of instructor.
Physical biochemistry of proteins; protein structure (primary, secondary, tertiary, and quaternary) in the crystal and in solution; relations to function: mechanisms of enzyme catalysis (kinetics). Alben, Brierley, Rieske, and Staff.

Advanced Physiological Chemistry
W. 3 cl.
Prereq.: 602 or 612 or equiv., Chem. 831, 832, 833 or permission of instructor.
Methods of studying cells, structure, and function of subcellular components, chloroplasts, and cytoplasmic-particle interactions; oxidative phosphorylation and biological transport. Alben, Brierley, Rieske, and Staff.

Advanced Physiological Chemistry
Sp. 3 cl.
Prereq.: 602 or 612 or equiv., Chem. 831, 832, 833 or permission of instructor.
Biochemistry of nucleic acids and the genetic code; protein biosynthesis and its control; control of enzymatic reactions and metabolic pathways. Alben, Brierley, Rieske, and Staff.

Physical Methods in Biochemistry
W. 2 cl., 1 3-hr. lab.
Prereq.: 821, Physical Chemistry, or permission of instructor.
A practical and theoretical introduction to the use of the analytical ultracentrifuge, Tiselius electrophoresis, spectroscopy, chromatography and radioisotopes. Alben and Rieske. Fee.

Biochemical Preparations and Techniques
A. 9 hrs. conf. and lab.
Prereq.: 821; prereq. or concur. 822.
Advanced course in biological preparations and laboratory techniques; isolation of carbohydrates, lipids, proteins, enzymes, and hormones. Fee.

Seminars
Prereq. or concur.: 601, 611, or equiv.
Repeatable to a maximum of 9 cr. hrs.
Required of all grad. students majoring in Physiol. Chem.
Cornwall and Staff.

Seminars in Physiological Chemistry
Repeatable to a maximum of 8 cr. hrs.
Topic to be announced.

Interdepartmental Seminar in Nutrition and Food Technology
Sp. See Interdepartmental Seminars, University Academic Policies and Course Offerings catalog.

Research in Physiological Chemistry
Research for thesis or dissertation purposes only.

Physiological Optics
Office: 111 Optometry Building, 338 West 10th Avenue
Professors: Hebbard (Chairman), Blackwell, Fry, and Hill; Associate Professors: Eskridge, King, and Smith; Assistant Professors: Bailey, Fugate, Haines (Emeritus); Ingling, Kerr, Mote, Reese, and Warshaw; Instructors: Jozwiak, Lowther, and Schoessler.

Introduction to Physiological Optics I
Sp. 4 cl., 1 2-hr. lab.
Not for grad. credit to students majoring in Physiol. Opt.
The eye as an optical instrument; the refracting mechanism; the mechanism of accommodation and pupilary contraction; blur of the retinal image; stray light in the eye.

Introduction to Physiological Optics II
A. 4 cl., 1 2-hr. lab.
Prereq.: 511.
Not for grad. credit to students majoring in Physiol. Opt.
The motility of the eye; the structure and innervation of the extracocular muscles; the center of rotation; and analysis and description of eye movements.

Measurement and Specification of Visual Stimuli
A. 3 cl., 1 2-hr. lab.
Prereq.: Optom. 2nd yr. standing and 511.
Not for grad. credit to students majoring in physiol. Opt.
Light sources; diffusely transmitting and reflecting surfaces and scattering of light by a medium; principles of photometry and colorimetry as applied to visual stimuli.

Basic Human Anatomy
A. 3 cl., two 2-hr. lab.
Prereq.: Optom. 1st yr. standing or major in Physiol. Opt.
Basic human developmental, neural, and gross anatomy, using models and films, supplemented with animal demonstrations.
555  U P 5
Microscopic Anatomy
W. 3 cl., 2 2-hr. lab.
Prereq.: Optom 1st yr. standing or major in Physiol. Opt.
Microscopic anatomy of cells and tissues, and special histology of the organ systems.

608  U P G 5
Anatomy of the Eye
Sp. 3 cl., 2 2-hr. lab.
Prereq.: 1st yr. Optom. or Zool. 530 and permission of instructor.
Human gross anatomy of the head and neck with special emphasis on the eye and orbit; histology and embryology of the eye and associated structures.

613  U G 5
Intermediate Physiological Optics I
W. 4 cl., 1 2-hr. lab.
Prereq.: 512.
Monocular sensory mechanisms of vision; analysis and specification of visual stimuli; photoreception and retinocortical transmission; adaptation of photoreceptors; flicker; brightness discrimination; and color-vision.

614  U G 3
Intermediate Physiological Optics II
W. 3 cl.
Prereq.: 512.
Circulation and metabolism of the eye; intra-ocular pressure; lacrimal system; movements and functions of the eyelids.

693  U G 1-15
Individual Studies in Physiological Optics
Prereq.: Permission of dept. chairman.
Repeatable to a maximum of 15 cr. hrs.
A properly qualified student may perform a minor investigation or add to his knowledge and technique.

715  U G 5
Intermediate Physiological Optics III
Sp. 4 cl., 1 2-hr. lab.
Prereq.: Optom 2nd yr. standing and 613.
Projection of visual impressions; the horopter, retinal correspondence; binocular integration of hue and brilliancy.

716  U G 5
Intermediate Physiological Optics IV
W. 3 cl., 1 2-hr. lab.
Prereq.: 715.
Visual perception of color, illumination, figure-ground relations, size, shape, direction, distance, motion, time, and complex patterns.

730  U G 5
Principles of Lighting
W. 4 cl., 2 2-hr. lab.
Prereq.: 715.
The effect of the distribution of light in a given environment upon efficiency, comfort, and safety; selection and arrangement of sources and light control.

731  U G 5
Vision in Industry
Sp. 5 cl.
Prereq.: 730.
Visual testing in industry; relation of vision to performing a task; visual requirements for licenses; eye hazards and protection; compensation for loss of vision.

732  U G 5
Vision in Schools
A. 3 cl., 6 hr. lab.
Prereq.: 730.
Visual survey methods; the prevalence of visual anomalies and eye diseases in children; basic visual skills required in school and methods for their improvement.

795  U P G 1-3
Seminar
Prereq.: Permission of instructor.
Repeatable to a maximum of 30 cr. hrs.
A series of seminars dealing with new developments in the various phases of physiological optics.

801  G 5
Advanced Physiological Optics I
A. 3 cl., 2 2-hr. lab.
Prereq.: 716.
The ocular image-forming mechanism; accommodation and pupil contraction, aberrations, stray light entopic phenomena; shape, size, distortion; retinal illuminance and blur.

802  G 5
Advanced Physiological Optics II
W. 3 cl., 2 2-hr. lab.
Prereq.: 801.
Fixation disparity; photochemistry and electrophysiology of photo-receptors; luminosity; color-mixture; retinal-cortical transmission; simultaneous contrast; visibility; adaptation; after images.

803  G 5
Advanced Physiological Optics III
Sp. 3 cl., 2 2-hr. lab.
Prereq.: 802.
Binocular integration of hue and brilliancy, fusional movements, fixation, retinal correspondence, visual perception of figure-ground relations, light, color, illumination, size, shape, direction, distance, and motion.

810  G 5
Image Evaluation
A. 5 cl.
Prereq.: 613, Physics 435, and 436.
An analysis of the causes of image impairment in the human eye and other optical systems; objective methods of assessing aberrations and blur; methods of image enhancement.

811  G 5
Mechanisms Subserving Color Vision
W. 5 cl.
Prereq.: 613.
Theoretical basis for chromatic adaptation, chromatic contrast and induction, color blindness, and other color phenomena; theory of the laws of color mixture.
812  G 5
Advanced Neurophysiology of the Visual System
A. 4 cl., 1 2-hr. lab.
Prereq.: 613, 614, 715, and 716.
The coding and transmission of visual information in
the direct and accessory pathways of vertebrates and
invertebrates.

813  G 5
Advanced Physiology of the Eye
A. 4 cl., 1 2-hr. lab.
Prereq.: 613 and 614.
Recent developments in the respiration, metabolism,
and mechanics of ocular tissues, and the aqueous
dynamics of the eye.

815  G 5
Binocular Vision and Perception
W. 3 cl., 1 2-hr. lab.
Prereq.: 803.
Visual perception: direction, space, motion;
perceptual adaptation; binocular vision and fusion.

820  G 5
Specification of Visual Stimuli
A. 3 cl., 4 hr. lab.
Prereq.: 801 or permission of instructor.
Study of visual stimuli and apparatus to control
parameters such as intensity, spectral composition,
retinal location, and pupil size and location; calibration
and practical application.

999  (950)  G Arr.
Research in Physiological Optics
Research for thesis or dissertation purposes only.

Physiology
Office: 4198 Medical Basic Science Building, 370 West
Ninth Avenue
Professors Little (Chairman), Angerer, Bozler, Grubbs,
Haust, Lesler, Myers, Pieper, Smith, and Welch;
Associate Professors Berman, Brownell, Kunz, LeBrie,
Lipetz, Lipsky, Nishikawa, and Stow; Assistant
Professors Allison, Billings, Grossie, Hays, Hendrich,
Mathews, Michal, Noyes, Paul, and Sparkman;
Instructors Blair, Delahayes, Holt, and Yake.
For related courses see Biology.

311  (505)  U 5
Principles of Human Physiology I
A, Sp. 4 cl., 1 2-hr. lab.
Prereq.: 2 qtrs. Chem., Anat. 200 or equiv.; or
permission of instructor.
Open only to students in College of Medicine or
College of Pharmacy.
Credit not given for 311 without 312.
First of a two-quarter sequence covering the
following areas of physiology: neuromuscular, heart
and circulation, endocrine, brain and special senses, body
fluids and kidney, respiration, digestion, temperature
control, and metabolism.

312  (507)  U 5
Principles of Human Physiology II
Su, W. 4 cl., 1 2-hr. lab.
Prereq.: 311.
Not open to students with credit for 410, 421, or 422.
Continuation of 311.

600  U 4
Human Physiology for Bio-medical Engineers
A. 4 cl.
Prereq.: Grad. standing in Bio-medical Engineering;
open to selected 4th yr. Engr. students by permission
of instructor.
An introduction to the function of the major human
organ systems and the medical aspects of engineering
problems for Bio-medical engineers. Little and Staff.

601  U P G 5
Advanced Mammalian Physiology I
A. 4 cl., 1 lab.
Prereq.: Inorganic and Organic Chem., Physics
111, 112, 113 or equiv., and 1 yr. Biological Sciences,
and permission of instructor for undergraduates.
Credit for 601 not given without 602; not for grad.
credit to students majoring in Physiol.; not open to
students with credit for 515 or 517.
First of a two-quarter sequence presenting the
following areas of physiology: neuromuscular, heart
and circulation, endocrine, brain and special senses, body
fluids and kidney, respiration, digestion, temperature
control, and metabolism.

602  U P G 5
Advanced Mammalian Physiology II
W. 4 cl., 1 lab.
Prereq.: 601.
Not for grad. credit to students majoring in Physiol.;
not open to students with credit for 517.
Continuation of 601.

604  P G 6
Advanced Physiology
A. 5 cl., 1 3-hr. lab.
Prereq.: Dent. 2nd yr. standing.
The cardiovascular system including blood,
neuromuscular system, body fluids, and excretion.

605  P G 6
Advanced Physiology
W. 5 cl., 1 lab.
Prereq.: Dent. 2nd yr. standing and 604 or equiv.
The central nervous system and special senses,
respiration, digestion, metabolism, the endocrines,
and reproduction; continuation of 604.

635  P G 7
Human Physiology I
W. 5 cl., and labs.
Prereq.: Med. 1st yr. standing.
First of a two-quarter sequence presenting the
following areas of Physiology: Neuromuscular system,
reflexes, respiration, special senses, cardiovascular
system, digestion, kidney, endocrine, and central
nervous system. Little and Staff.
638 P G 8
Human Physiology II
Sp. 5 cl., and labs.
Prereq.: 635.
Continuation of 635. Little and Staff.

723 P G 5
Cellular and Comparative Physiology
A. 4 cl., 1 lab.
Prereq.: 1 yr. each of Biol., Physics, and Organic Chem., and permission of instructor.
Not open to students with credit for 523 or 823.
Interaction between cells and their environment at the microscopic, submicroscopic, and molecular levels; regulation and control of protoplasmic functions. Lessler.

730 P G 5
Endocrinology
Sp. 4 cl., 1 lab.
Prereq.: 311 and 312, Organic Chem. and permission of instructor.
Not open to students with credit for 630 and 830.
A study of functions of the thyroid, parathyroid, pituitary, adrenal, pancreas, gonads, and other organs with possible endocrine functions. Brownell, Nishikawara, and Staff.

746* P G 5
Radiation Biophysics
A. 5 cl.
Prereq.: 1 yr. each of college Biol., Math., Physics, and Physiol. and Physiol. Chem. 601, 602 or 611, 612 or equiv., and permission of instructor.
Not open to students with credit for 646 or 846.
Stable and radioactive isotopes; biological effects of ionizing radiation. Myers and Staff.

748 P G 3
Physical Instrumentation for Biologists
A. 1 cl., 2 lab.
Prereq.: Elementary Physiol. and 1 yr. college Physics or permission of instructor.
Not open to students with credit for 648 or 848.
Basic concepts in semiconductor electronics; representative small signal, digital, and integrated circuits, input and output transducers, recording, storage and elementary information processing techniques are studied in the laboratory; emphasis is on representative examples rather than on a comprehensive survey of instruments. Stow.

793 U P G 2-18
Individual Studies in Physiology
Prereq.: Permission of instructor.
Reading, conferences, laboratory work by individual arrangement with qualified students who desire more intensive and specialized study than is available in other courses.

801 G 2
Topics in Physiological Research
A. 2 cl.
Prereq.: Grad. 1st yr. standing in Physiol. or permission of instructor.
Formal lectures and demonstrations from the graduate faculty of Physiology describing their areas of research interest, explaining the relationship of these areas to the subject matter of physiology and pointing out their pertinence to current frontiers in physiology.

825 (725) G 7
Advanced Human Physiology I
W. 5 cl., and labs.
Prereq.: Grad. standing in Physiol., permission of dept. chairman.
Credit for 825 not given without 826.
First of a two-quarter sequence presenting the systematic study of the basic mammalian organ systems and their interactions. Little and Staff.

826 (725) G 8
Advanced Human Physiology II
Sp. 5 cl., and labs.
Continuation of 825. Little and Staff.

828 G 3
Advanced Cellular and General Physiology
Sp. 4 cl.
Prereq.: Chem. 571 or equiv., Physics 112 or equiv.; Biol. 640; Physiol. Chem. 611, 612 or equiv.; permission of instructor.
Current concepts of ultrastructures and their function in various protoplasmic systems; membrane phenomena; excitable processes; energy utilization in various kinds of cells. Angerer.

840 (740) G 3
Environmental Physiology I
A. 3 cl.
Prereq.: M.D. Degree or grad. standing and 601 and 602 or equiv., and permission of instructor.
Physiology of the gaseous environment. Billings and Hiatt.

841 G 3
Environmental Physiology II
W. 3 cl.
Prereq.: M.D. Degree or grad. standing and 601 and 602 or equiv., and permission of instructor.
Physiology of the electromagnetic environment. Billings and Hiatt.

842 G 3
Environmental Physiology III
Sp. 3 cl.
Prereq.: M.D. Degree or grad. standing and 601 and 602 or equiv., and permission of instructor.
Physiology of the kinetic environment. Billings and Hiatt.

850 (815) G 2
Seminar in Physiology
Repeatable.
907  G 3 or 5  
Advanced Studies in Physiology
Prereq.: 602 or equiv., or 156 or equiv.
Quarter schedule of topics to be announced.
907.01 Neuromuscular System
Bozler and Grosse.
907.02 Cardiovascular Physiology
Little, Pieper, Hanson, Paul, and Clancy.
907.03 Adaptation to Extreme Environments
Hatt and Weiss.
907.04 Digestion and Metabolism
Grubbs and Beman.
907.05 Physico-Chemical (General) Physiology
Angerer and Lessler.
907.06 Biophysics
Stow.
907.07 Endocrinology
Nishikawa, Brownell, and Hendrich.
907.08 Sensory Electrophysiology
Lipetz and Michael.
907.09 Comparative-Avian Physiology
Weiss.
907.10 Renal Physiology
LeBrie.
907.11 Respiration Physiology
Lipsky and Smith.
907.12 Biological Controls
Kunz.

999  (950)  G Arr.
Research in Physiology
Research for thesis or dissertation purposes only.

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Plant Pathology

Office: 210 Botany and Zoology Building, 1735 Neil Avenue
Professors: Deep (Chairman), Alexander, Allison, Bohning, Elliott, Janson, Leben, Partyka, Schmittchen, and Williams (Associate Chairman, Wooster); Associate Professors: Bradfute, Herr, and Troxel; Assistant Professors: Farley, Garraway, Gingery, Gordon, Holtink, Jones, Larsen, Louie, and Muse.

GENERAL PREREQUISITES FOR COURSES NUMBERED 300 AND 400
Unless otherwise indicated, the prerequisites for 300 and 400-level courses of 90 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-399.

401  (519)  U 5
General Plant Pathology
A, Sp.  3 cr., 2 2-hr. lab.
Prereq.: Bot. 102.
Not open to students with credit for 470.

GENERAL PREREQUISITES FOR COURSES NUMBERED 600
Unless otherwise indicated, the prerequisites for 600-level courses are 15 cr. hrs. in courses in the same discipline numbered 300 or higher; or 10 cr. hrs. in courses numbered 300 or higher in specified allied disciplines.

610  (649)  U G 3
Diseases of Ornaments
W.  1 1-hr. cl., 2 2-hr. lab.
Prereq.: 401.
Not open to students with credit for 471.
A detailed study of important diseases of floral and woody ornamental plants; their cause, distribution, severity, importance, and specific control measures. Elliott.

615  U G 3
Economic Plant Pathology
A.  1 cr., 2 2-hr. lab.
Prereq.: 401 or equiv.
Not open to students with credit for 671, 672, or 675.
Principles of plant pathology relating to diseases of field, fruit, and vegetable crops; laboratory work with diseases of crops of interest to the student. Allison.

685  U G 2
Field Plant Pathology
Su.  1 4-hr. cl. arr.
Prereq.: 401 or 615, and permission of instructor.
Study of plant diseases in the field with emphasis on diagnosis and epidemiology; supplementary laboratory work. Elliott. Fee.

693  U G 1-5
Individual Studies
H693 (honors) may be available to students enrolled in a college honors program or eligible for enrollment.
Prereq.: Permission of instructor.
Repeatable to a maximum of 10 cr. hrs.
Problems may be selected in the various areas of plant pathology.

694  U G 2, 3, or 5
Group Studies
Prereq.: Senior or grad. standing.
Repeatable to a maximum of 10 cr. hrs.
Special group studies of a selected area in plant pathology not provided in other courses.

GENERAL PREREQUISITES FOR COURSES NUMBERED 800 AND 900
Unless otherwise indicated, the prerequisites for 800 and 900-level courses are 30 cr. hrs. in courses in the same discipline, or 20 cr. hrs. in courses numbered 300 or higher in specified allied disciplines.
836  (751)  G 5
Plant Nematology
A.  2 cl., 2 2-hr. lab., several field trips.
Prereq.: 821 and 822.
Not open to students with credit for 874.
Biomics and taxonomy of nematodes which cause
plant diseases; host-parasite interactions; methods
used in studying plant parasitic nematodes.

995  (815)  G 1
Seminar
Prereq.: Permission of instructor.
Repeatable.
Deep.

999  G Arr.
Research
Research for thesis or dissertation purposes only.

Polish
Office: 204 Dieter Unz Hall of Languages, 1841 Millikin
Road
Associate Professor Krzyzanowski.

601*    U G 4
Polish
Su, A.  3 cl., 2 hr. arr.
Prereq.: Russ. 103, or 112, or permission of instructor.

602*    U G 4
Polish
Su, W.  3 cl., 2 hr. arr.
Prereq.: 601.

603*    U G 4
Polish
Su, Sp.  3 cl., 2 hr. arr.
Prereq.: 602.

604*    U G 3
Intermediate Polish
A.  3 cl.
Prereq.: 603 or equiv.

605*    U G 3
Intermediate Polish
W.  3 cl.
Prereq.: 604 or permission of instructor.
Reading texts of moderate difficulty, conversation,
and simple compositions.
606† U G 3
Intermediate Polish
Sp. 3 cl.
Prereq.: 605 or permission of instructor.
Reading from modern Polish literature, practice in writing and speaking.

612† U G 15
Study Tour of Poland
Sp.
Prereq.: 605 or equiv. and permission of dept. chairman.
Students will receive advanced work in conversation and reading in preparation for the tour; in Poland only Polish will be spoken; daily instruction by tour leaders.

620† U G 5
Polish Literature in English Translation
A. 3 cl.
Polish literature from the Medieval Period to 1865: the Medieval period, Renaissance, Baroque, Classicism, Romanticism; emphasis on Kochanowski, Mickiewicz, Słowacki, Krasinski, and Norwid. Krzyzanowski.

621† U G 5
Polish Literature in English Translation
W. 3 cl.
Modern Polish literature from 1864 to the present; emphasis on Positivism, Realism, and Symbolism; novels of Prus, Sienkiewicz, Zeromski, and Reymont. Krzyzanowski.

683 U G 2-10
Individual Studies in Polish
Prereq.: Permission of dept. chairman.
Each decimal subdivision repeatable to a maximum of 20 cr. hrs.

683.01 Literature to 1820
683.02 Literature 1820-1860
683.03 Literature after 1860
683.04 Morphology
683.05 Phonology
683.06 Dialectology
683.07 Old Polish
683.08 Unspecified

684 U G 2-10
Group Studies
Prereq.: Permission of chairman.
Repeatable to a maximum of 15 cr. hrs.

722† U G 5
Contemporary Polish Literature
Sp. 3 cl.
Prose and poetry since 1945; emphasis on Borowski, Brandy, Słonimski, Andrzejewski, Dabrowska, Halsko, Iwaszkiewicz, Stawinski, and Rozewicz.

821† G 5
The Structure of Polish
W. 3 cl.
Prereq.: 606 or permission of instructor.
Analysis and description of the phonological and morphological systems of contemporary standard Polish.

830† G 5
Mickiewicz and Romanticism
A. 3 cl.
Prereq.: 606 and 621, or permission of instructor.
Critical analysis of the major works of Polish Romantic poetry and drama; emphasis on Mickiewicz's poems, dramas, and criticism.

831† G 5
The Age of Realism
W. 3 cl.
Prereq.: 606 and 621, or permission of instructor.
Fiction of the second half of the 19th century; emphasis on Sienkiewicz and Prus; intellectual and literary development.

832† G 5
Twentieth Century Polish Writers to 1939
Sp. 3 cl.
Prereq.: 606 and 621, or permission of instructor.
Fiction, poetry, and drama, from the Neo-Romantic period to World War II; emphasis on Zeremski, Reymont, and Wyspianski.

850† G 5
Seminar in Polish Literature to 1820
W. 2 cl.
Prereq.: 722 or permission of instructor.
Repeatable to a maximum of 15 cr. hrs.

851† G 5
Seminar in Polish Literature 1820-1860
A. 2 cl.
Prereq.: 722 or permission of instructor.
Repeatable to a maximum of 15 cr. hrs.

852 G 5
Seminar in Polish Literature after 1860
W. 2 cl.
Prereq.: 722 or permission of instructor.
Repeatable to a maximum of 15 cr. hrs.

993 G 2-10
Individual Studies
Prereq.: Permission of chairman.
Repeatable to a maximum of 40 cr. hrs. in any combination of decimal subdivisions.

993.01 Literature to 1820
993.02 Literature 1820-1860
993.03 Literature after 1860
993.04 Morphology
993.05 Phonology
993.06 Dialectology
993.07 Old Polish
993.08 Unspecified
Political Science

Office: 100 University Hall, 216 North Oval Drive

Professors: Ripley (Chairman), Aumann, Flinn, Heinberger (Emeritus), Helms (Emeritus), Herson, Kettler, Mansfield (Emeritus), Nemzer, Robinson, Sanl, Spencer (Emeritus), Spitz, and Walker (Emeritus); Associate Professors: Burgess, Richardson, and Stewart; Adjunct Associate Professors: Gibson (Mansfield) and Higgs; Assistant Professors: Axline, Bedeski, Champlin, Holdertor, Levinson, Liddle, and McCoy; Adjunct Assistant Professors: Quigley; Instructors: Andrews, Hart, Harrison, Kweder, Meckstroth, Milder, Nelson, and Patton (Mansfield).

100 (401) U 5
American National Government
Su, A, W, Sp. 5 cl.
Not open to students with credit for 265.
Introductory study of constitutional principles (federalism, civil liberty, judicial review); political processes (parties, elections, legislative process); problems of national policy in selected areas of interest. Andrews and Staff.

225 (509) U 5
Foreign Governments and Politics
A, W, Sp. 5 cl.
Prereq.: 1 course in Pol. Sc. or Hist. 123, or Hist. 101-102.
A comparative examination of the governmental systems and political processes of selected European and non-Western countries. Meckstroth, Milder, and Staff.

245 (530) U 5
International Tensions
A, W, Sp. 5 cl.
Prereq.: 2nd yr. standing.
Causes of international tensions and conflicts; international security organizations; basic issues in world politics. Axline, Burgess, and Staff.

265 (507) U 5
Fundamentals of Government
A, W, Sp. 5 cl.
Prereq.: Hist. 123.
Not open to students with credit for 100.
A study of political ideas, institutions, processes, and problems, presenting comparatively the leading types of government in the modern world. Kettler and Staff.

300 (508) U 5
The American System of Government
Su, A, W, Sp. 5 cl.
Prereq.: 1 course in Pol. Sci.
Not open to students with credit for 100 or 200.
An intermediate study of American national government, primarily for prospective majors in the social sciences, and for pre-law students.

325 U 5
Introduction to Comparative Politics
A, W, Sp. 5 cl.
An introduction to basic theories, approaches, and methods of analysis in comparative politics; substantive discussion of selected topics.

345 (613) U 5
Introduction to International Systems
A, W, Sp. 5 cl.
Not open to students with credit for 545.
Political relations among states; methods and goals of diplomacy; current problems in major areas of tension; tendencies toward administrative, judicial, and legislative world organization. Axline and Burgess.

365 (601) U 5
Introduction to Political Theory
A, W. 5 cl.
Not open to students with credit for 565.
Survey of knowledge about human political behavior; basic work for the role of the individual and the group in politics.

501 (655) U G 5
Presidential Leadership and the Presidency
W. 5 cl.
Not open to students with credit for 601.
A study of presidential power and responsibility; the roles of the present; the policies of leadership; the presidency as an institution. Ripley.

505 (607) U G 5
American Municipal Government
A, W, Sp. 5 cl.
A study of municipalities in United States, their social significance, governmental structure; and experience with government by council, mayor, commission, and manager. Andrews.

506 (609) U G 3
Government of Ohio
Sp. 3 cl.
Constitution, structure, and functions; the electoral system; finance and personnel; judiciary and law enforcement; organization and conduct of administrative programs; state relations with local governments.
561  U G 5
Government and Politics of the New States
W.  5 cl.
A general introduction to the theoretical and substantive literature dealing with the historical development and contemporary characteristics of the new states of Asia and Africa. Liddie.

560†  (652 B)  U G 5
Regional Patterns in International Politics
A.  5 cl.
Repeatable to a maximum of 15 cr. hrs.
Examination of ideological, institutional, and foreign political patterns in particularized regions, such as Sub-Sahara Africa, Arab Middle East, Southeast Asia.

562  (652 D)  U G 5
Regional Patterns in International Politics: Latin America
Sp.  5 cl.
Basic power concepts, political institutions, and international relations of Latin America. McCloy.

571  U G 5
Democracy and Dictatorship
A.  5 cl.
A critical analysis of contemporary theories of democracy, and of the communist and fascist forms of dictatorship. Spitz.

572  U G 5
Political Theory and Political Science
Sp.  5 cl.
An examination of theoretical problems encountered in empirical political science in light of the skills and concerns of traditional political theory. Champlin.

573  (624)  U G 3
American Political Ideas
W.  3 cl.
An analysis of American ideas on law and government, authority and liberty, oligarchy and democracy, from the Puritans to the present day. Levinson and Spitz.

578†  U G 5
Political Decision Making
A.  3 cl., 1 lab.
Not open to students with credit for 378.
An introduction to decision-making and policy-making analysis, with emphasis on situational, individual, and organizational factors that explain decision and policy outcomes. Robinson.

585†  U 5
Techniques of Political Analysis
Sp.  5 cl.
Introduction to research design, nature of data, its generation and machine analysis, variable analysis, and simple inferential analysis, applied and developed within political science. Burgess, Flinn, and Holtzclaw.

594  (600)  U G 5
Contemporary Political Problems
A, W, Sp.  5 cl.
Repeatable to a maximum of 10 cr. hrs.

GENERAL PREREQUISITES FOR COURSES NUMBERED 600 AND 700
Unless otherwise indicated the prerequisites for 600 and 700-level courses are two courses in political science, or a declared major in another social science, or the consent of the instructor, or the history and social science requirements of the B.A. curriculum.

605  (510)  U G 5
American State Government and Politics
A, W, Sp.  5 cl.
Not open to students with credit for 205.
A comparative study of the American states as political systems within the American nation with attention to elections, political parties, interest groups, governmental institutions, policies, and programs. Andrews, Harrison, and Kweder.

610  (605)  U G 5
Principles of Public Administration I
Sp.  5 cl.
Basic problems of public administration; ends and means; the formulation of policy; organization and management; working methods of control; coordination and responsibility. Kweder.

611†  (606)  U G 5
Principles of Public Administration II
W.  4 cl., 1 lab.
Prereq.: 3 courses in Pol. Sc.
An examination of the principles of public administration as applied to the rendering of services to the public by national, state, and local government.

612†  (614)  U G 3
Public Personnel Administration
Sp.  3 cl.
Prereq.: 610.
The organization, purposes, and activities of civil service agencies, and the conduct of public personnel policies and processes.

615  U G 5
Administration of Justice
W.  5 cl.
A study of the nature, purposes, and limitations of law as administered through courts; the development, organization, and procedure of our judicial system; recent trends in legal thinking. Aumann.

616  U G 5
American Constitutional Law
A, W, Sp.  5 cl.
A study of leading constitutional principles in the United States as interpreted by the courts. Aumann.

620†  (618)  U G 5
The National Government and the National Economy
Sp.  5 cl.
Not open to students with credit for 526.
A study of the interaction of economic and political powers illustrated in major contemporary issues of national affairs.
626 (625) U G 5
British Government and Politics
W. 5 cl.
An analysis of the nature of politics and the conduct of government in contemporary Britain, including the making of foreign policy.

627 (628) U G 5
Government of Western Europe
A. Sp. 5 cl.
An examination of the political institutions and processes of France, West Germany, and the European integration movement. Meckstroth and Milder.

630 (636) U G 5
The Soviet Union
W. Sp. 5 cl.
A general study of the Soviet Union; governmental and party institutions; ideology and methods; problems of communist dictatorship. Nemzer and Stewart.

631† U G 5
Survey of the Social Sciences in the USSR
W. 3 cl.
Prereq.: 4th yr. standing or grad. standing or enrollment in Certificate Program for Translators. An introduction to bibliography and methodology of the Social Sciences in the USSR.

635 (650) U G 5
Government and Politics of Japan
W. 5 cl.
The government and politics of Japan, with special emphasis being given to the impact of cultural and social patterns on the processes of government with imported political institutions. Richardson.

636 (651) U G 5
Southeast Asia
A. 5 cl.
Governments and politics of the Philippines, Indonesia, Indo-China, Malaya, Thailand, and Burma; contemporary problems of this region in relation to world politics. Liddle.

637 U G 5
The Government and Politics of China
A. 5 cl.
Prereq.: 225 or 529 recommended. A study of the contemporary political process of Communist China; considerable time will be spent on an analysis of recent political change in China and the process of revolution.

640 (627) U G 5
Latin American Government and Politics
A. 5 cl.
Not open to students with credit for 540. A study of political processes, institutions, and groups in Latin America, with emphasis on constitutional, geographical, social, and economic environment in which they operate. McCoy.

650 (612) U G 5
International Law
Sp. 5 cl.
A study of the principles of international law. Axline.

651 (714) U G 5
International Organization and Administration
W. 5 cl.
An examination of the current system of international organization and its administrative aspects, with emphasis on the operations of the United Nations agencies. Axline.

655 (637) U G 5
Soviet Foreign Policy
A. 5 cl.
Basic concepts about, and choices in, Soviet foreign policy; development and present patterns of Soviet relations with key nations; major problems in future relationships. Nemzer and Stewart.

656 (640) U G 5
The United States in World Affairs
A. Sp. 5 cl.
Domestic factors and agencies influencing American foreign policy; basic patterns of recent American relations, especially with the Soviet bloc, Western Europe, and the Middle East.

658† (649) U G 5
International Relations of the Far East
Sp. 5 cl.
The Far East in contemporary world politics; factors underlying the foreign policies of the nations concerned with this region. Richardson.

668 (611) U G 5
Introduction to Jurisprudence
Sp. 5 cl.
A study of the concepts which legal systems develop and of the interests which law protects; ideas of various schools of juristic thought examined. Aumann.

670 (621) U G 5
History of Political Theory I: The Socratic Method
A. 5 cl.
The Socratic revolution in western political philosophy. Its consequences for human thought about man, the state, law, justice, property, power, happiness. Kettler and Champlin.

671 (622) U G 5
History of Political Theory II: From Machiavelli to Hegel
W. 5 cl.
A study of representative works by major modern thinkers—including Hobbes, Montesquieu, Rousseau, Kant and Hegel—seen in historical context. Kettler and Champlin.
672 (623) U G 5
History of Political Theory III:
Contemporary Political Thought
Sp. 5 cl.
An examination of the more important contemporary ideas on the nature of the state; anarchism, syndicalism, communism, fascism, socialism, and democracy. Spitz, Kettler, and Champlin.

675 (635) U G 5
American Political Parties and Pressure Groups
A, Sp. 5 cl.
Not open to students with credit for 575.
The organization, programs, and campaign methods of political parties and pressure groups; methods of nomination, suffrage, qualifications, campaign finance, and the conduct of elections. Finnn.

676 (634) U G 5
Public Opinion and Political Behavior
A, Sp. 5 cl.
The formation, organization, and effects of public opinion and propaganda in the modern state; emphasis on the role of groups in political behavior. Finnn and Hofstetter.

677 (633) U G 5
Legislation
Sp. 5 cl.
The processes of law-making in the United States, constitutions, statutes, executive ordinances, popular law-making, legislative drafting. Ripley.

685 U G 5
Introduction to Quantitative Methods I
A. 5 cl.
An analysis of statistical applications in the literature of political science. Hofstetter.

686 U G 5
Introduction to Quantitative Methods II
W. 5 cl.
Prereq.: 685.
Continuation of survey of statistical applications in the literature of political science. Hofstetter.

693 (701) U G 1-5
Individual Studies in Political Science
Prereq.: 4th yr. standing and 40 cr. hrs. in social sciences, including 15 cr. hrs. in Pol. Sc.
A special topic is assigned to each student and results are tested by papers and special examinations.

700 U G 5
Basic Theories in the Study of American Government and Institutions
A, W. 3 cl.
Canvass of institutional literature (Congress, Courts, the Presidency); examination of theoretical approaches (interest-group theory; theories of representation, decision-making models; theories of ideology). Andrews, Finnn and Ripley.

Introduction to National Security
(See Nat. Sec. Pol. 5, 702.)

725 U G 5
Basic Theories in the Study of Comparative Government
A, W. Sp. 3 cl.
Examination of such concepts and theories as structural-functional analysis; general systems theory; and sociocultural systems as determinants of governmental structures. Liddle, Mecksteth, and Richardson.

727* U G 5
Problems in Western European Politics
Sp. 1 2-hr. cl.
Prereq.: 626 or 627 or permission of instructor.
Intensive study of selected problems.

729 U G 5
Problems of Comparative Political Analysis
A, Sp. 5 cl.
Prereq.: 725.
Substantive comparative studies of political institutions, processes, and behavior from a variety of different political systems.

731 (737) U G 3
Problems in Soviet Politics
W. 3 cl.
Prereq.: 630 or 655.
An intensive examination of selected problems such as crises of succession, conflicts of pressure groups, Soviet policies in the United States, Sino-Soviet relations. Nemzer and Stewart.

734* U G 5
Problems in Asian Politics
A, Sp. 1 2-hr. cl.
Prereq.: 635 or permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
An advanced seminar for the purpose of structured reading of advanced scholarly materials and limited research experimentation in East and Southeast Asian topics.

741 U G 5
Political Development
A, Sp. 3 cl.
Prereq.: 541 or 636 or 640 or permission of instructor.
Theories, approaches, and methodology in the analysis of political life in the new states of Asia and Africa; discussion of selected case and cross-national studies with theoretical relevance.

745 U G 5
Basic Theories in the Study of International Relations
A, W, Sp. 3 cl.
Examination of such basic concepts and theories as equilibrium models, balance of power, national interest, geopolitical configurations. Burgess and Axline.
757* U G 5
Comparative Foreign Policies
W. 5 cl.
Prereq.: 655 or 656 or permission of instructor.
Examines comparatively the sources and classes of behavior of territorial actors in the international political system. Burgess.

758* U G 5
Regional Integration
A. 3 cl.
Prereq.: 650 or 651 or permission of instructor.
Political trends in and consequences of regional organization.

765 U G 5
Analytic Political Theory
W, Sp. 3 cl.
Analysis of basic concepts (power, elites, political change, etc); examination of holistic political analyses (Marx, Pareto, Mannheim, Maciiver, etc.). Spitz, Kettler, Champlin, and Levinson.

766 U G 5
Selected Topics in Political Theory
A, W. 1 2-hr. cl.
Prereq.: Grad. standing or permission of instructor.
Intensive joint readings and discussions concentrating upon one of the major themes, problems, or movements in political theory; topic information available from instructor.

775 U G 5
Basic Theories in the Study of Politics and Political Behavior
A, W, Sp. 3 cl.
Examination of basic concepts and theories, including socialization, survey research, simulation and gaming, social conflict and quantitative indicators of political action. Flinn and Hofsetter.

778 (734) U G 3
Comparative Political Parties
W. 3 cl.
Prereq.: 575 and 2 courses in foreign governments or equiv.
An examination of the nature and role of political parties in modern societies by the use of the comparative method. Meckstroth and Milder.

779† (736) U G 5
The Policy Process
Sp. 3-5 cl.
Prereq.: Senior standing and 15 cr. hrs. in Pol. Sc.
The roles of elites, ideology, organized interests, and issues in the making of government policy; case studies in the policy process. Ripley.

H783 (705) U 3-5
Honors Course
Prereq.: 4th yr. standing and 40 cr. hrs. in social sciences, including 15 cr. hrs. in Pol. Sc., with a record of A in at least half of the Pol. Sc. courses and an average of B in the remainder. Permission of instructor and the Honors Committee of the College. At least two qtrs. are required of candidates for the degree of Bachelor of Arts with Distinction in Pol. Sc. Failure to receive a grade of B in this course is a disqualification for special honors.
Repeatable to a maximum of 15 cr. hrs.
A special topic is assigned to each student and results are tested by the requirement of papers and special examinations.

Research Principles and Techniques in National Security
(See Nat. Sec. Pol. S. 785.)

790 (731) U G 5
Scope and Methods of Political Science
W, Sp. 1 2-hr. cl., 1 1-hr. cl.
Prereq.: 4th yr. standing and 15 cr. hrs. in Pol. Sc.
The materials of political science; history of procedure in political science research; research technique, presentation of results of research. Meckstroth.

791 U G 5
Problems in Research Design and Execution
A, W. 4 cl. 1 1-hr. lab.
Prereq.: Grad. standing or permission of instructor.
Examines the Methodological problems of research designs for the acquisition and analysis of data with special attention to the methods of cross-national research.

794 (735) U G 3-5
Contemporary Political Problems
A, W, Sp. 2 3-hr. cl.
Prereq.: Senior standing and 15 cr. hrs. in Pol. Sc.

GENERAL PREREQUISITES FOR COURSES NUMBERED 800 AND 900
A general foundation in undergraduate courses in history and the social sciences is assumed. Any of the 200-level courses listed may be repeated provided that no student shall earn more than 10 hours of credit in any single course.

Seminar in National Security Research
(See Nat. Sec. Pol. S. 801.)

801 G 3-5
American National Government and Institutions
A, Sp. 2 cl.
Prereq.: 700 or permission of instructor.
Seminar in national political institutions, Congress, Courts, the Presidency, and federalism. Flinn, Harrison, Robinson, and Ripley.
807 (809) G 3-5
Municipal Government
A, W. 1 2-hr. cl.
Prereq.: 505. 610. 611. or equiv.
Seminar in the municipal governments of the United States and Europe. Andrews and Flinn.

813 (808) G 3-5
Public Administration
W. 1 2-hr. cl.
Prereq.: Any 2 of: 610, 611, 612, 520, (720) or equiv.

818 (811) G 3-5
Public Law
W. 1 2-hr. cl.
Prereq.: 615 and 616.
Seminar in the field of public law, including special problems in the fields of constitutional law or judicial administration. Aumann.

826 (806) G 3-5
Comparative Government
A, W, Sp. 1 2-hr. cl.
Prereq.: 2 Pol. Sc. courses in foreign governments at 600 level or above, or equiv.
Seminar in the governments of foreign countries. Nemzer and Richardson.

846 (810) G 3-5
International Relations
A, W, Sp. 1 2-hr. cl.
Prereq.: 651 or 656 or 545 or equiv.
Seminar in international relations. Burgess.

856 (805) G 3-5
Political Thought
W, Sp. 1 2-hr. cl.
Prereq.: Previous coursework in political thought; permission of instructor. Seminar in the history of political ideas and in the theoretical problems of contemporary politics for advanced students in related departments. Spitz, Kettler, and Champlin.

876 (807) G 3-5
Political Parties and Pressure Groups
A, Sp. 1 2-hr. cl.
Prereq.: 2 courses in Pol. Sc. at 600 level or above, including 575.
Seminar in American political parties and pressure groups. Flinn and Hofstetter.

877* G 5
Policy Making
A. 1 2-hr. cl.
Prereq.: Permission of instructor.
Repeatable to a maximum of 10 cr. hrs.
Research into the process of policy-making and the substance of public policy decisions.

949† G 1-5
Interdepartmental Seminar
(See under Interdepartmental Seminars.)

999 (950) G Arr.
Research in Political Science
Research for thesis or dissertation purposes only.

Portuguese
Office: 218 Dieter Cunz Hall of Languages, 1841 Millikin Road
Professors Bulatkin (Chairman) and Griffir; Assistant Professor Kerr; Lecturer Ricardo.

101 (401) U 5
Elementary Portuguese
A, Sp. 5 cl.
May not be taken concur. with French 101-102, Ital. 101-102, Span. 101-102.
Not open to students who are not eligible to take Engl. 101. Credit in 101 will be counted toward graduation only if followed by successful completion of 102, or if taken after successful completion of the first regular university course in another foreign language.
Elements of Portuguese grammar, with oral and written exercises; attention to ear training and oral practice; and customs.

102 (402) U 5
Elementary Portuguese
A, W. 5 cl.
Prereq.: 101.
May not be taken concur. with French 101-102, Ital. 101-102, Span. 101-102.
The elements of Portuguese grammar with abundant oral and written exercises; development of conversational skill; reading, vocabulary building.

103 (403) U 5
Intermediate Portuguese
W, Sp. 5 cl.
Prereq.: 102.
Continuation of Portuguese grammar; reading of short stories, plays, and novels; increased attention to development of oral proficiency.

104 (404) U 5
Intermediate Portuguese
A, Sp. 5 cl.
Prereq.: 103 or 112.
Reading of Portuguese plays, short stories, and novels; emphasis on oral practice; non-fiction of cultural and historical significance.
112 U 5, 10, 15
Intensive Portuguese
Su. 15 cl. Enrollment limited to 20 students.
Full time of student and full fees required.
Prereq.: Permission of chairman.
Equiv. of 101, 102, and 103. Students with credit for 101 or the equiv. may not register for more than 10 hrs.
Students with credit for 101 and 102 or the equiv. may not register for more than 5 cr. hrs. Students with credit for 103 or the equiv. may not register for credit.
Elementary and intermediate Portuguese; intensive drill in forms, syntax, vocabulary, and idiom; reading of short stories and plays in Portuguese.

202 U 5
Portuguese Conversation and Composition
W. 5 cl.
Prereq.: 104 or permission of instructor.
Intensive practice in conversation and composition based on materials concerning current life in Brazil and Portuguese, with thorough review of grammar.

401 U 3
Review Grammar and Composition
Sp. 3 cl.
Prereq.: 104.
Review of Portuguese grammar; compositions based on readings.

404+ U 5
Portuguese Pronunciation
W. 5 cl.
Prereq.: 104.
Practice with corrective exercises to continue development of aural-oral skills.

421 U 5
Introduction to Modern Luso-Brazilian Literature
A. 5 cl.
Prereq.: 104.
Reading and discussion of important modern Portuguese and Brazilian literary works.

422 U 5
Modern Prose Fiction
W.
Prereq.: 421 or permission of instructor.
Representative readings of modern Portuguese and Brazilian novels and short stories.

423 U 5
Modern Poetry and Drama
Sp.
Prereq.: 421 or permission of instructor.
Representative readings from modern Luso-Brazilian poetry and drama; lectures, discussions, and reports.

620+ U G 5
Main Currents in the Development of Portuguese Literature
A. 5 cl.
Prereq.: 421, and 422 or 423, or permission of instructor.
Portuguese literature from the Middle Ages to the present with emphasis on the evolution of major movements.

621+ U G 5
Main Currents in the Development of Brazilian Literature
A. 5 cl.
Prereq.: 421, and 422 or 423, or permission of instructor.
Brazilian literature, including the Portuguese colonial literature, from the 16th century to the present.

622+ U G 5
Luis de Camões
W. 5 cl.
Prereq.: 421, or 422 and 423, or permission of instructor.
An intensive study of Os Lusiadas.

623+ U G 5
The Modern Brazilian Novel
W. 5 cl.
Prereq.: 421, and 422 or 423, or permission of instructor.
The Brazilian novel from the 1930's to the 1960's.

694 U G 1-15
Group Studies in Portuguese
Prereq.: Permission of instructor.
Repeatable to a maximum of 30 cr. hrs.

993 G 1-5
Individual Studies in Portuguese
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.

994 G 1-15
Group Studies in Portuguese
Prereq.: Permission of instructor.
Repeatable to a maximum of 30 cr. hrs.
Investigation of minor problems in the various fields of Portuguese literature and language.

Poultry Science
Office: 108 Poultry Administration Building, 674 West Lane Avenue

Professors Naber (Chairman), Baker, Eohl, Brown, Clayton, Harvey, Jaap, Marsh, and Tuchburn (Associate Chairman, Wooster); Associate Professors Allred, Malinovsky, and Stephens; Assistant Professors Bacon, Chamberlin, Mohamed, and Nestor.

Domestic Animals in the Service of Man
(See Animal Sc. 100)
(Offered in cooperation with the Depts. of Dairy Sc. and Poul. Sc.)
GENERAL PREREQUISITES FOR COURSES NUMBERED 200.
Unless otherwise indicated, the prerequisites for 200-level courses are 45 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-199.

200  (401)  U 5
Fundamentals of Poultry Science
A, Sp.  4 cl., 1 2-hr. lab., 1-day field trip.
Prereq.: Biol. 100 or Animal Sc. 100.
Fundamental principles of poultry production and marketing. Marsh and Mountney.

GENERAL PREREQUISITES FOR COURSES NUMBERED 300 AND 400
Unless otherwise indicated, the prerequisites for 300 and 400-level courses are 90 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-399.

420  U 5
Principles of Animal Improvement
A, W, Sp.  5 cl.
Prereq.: Animal Sc. 100, Math. 150 or equiv., and Genetics 314.
Not open to students with credit for Animal Sc. 420 or Dairy Sc. 420.
(Cross-listed in the Depts. of Animal Sc. and Dairy Sc.)
An introduction to the methods available for bringing about genetic change in farm animals. Flechheimer, Jaap, and Swiger.

GENERAL PREREQUISITES FOR COURSES NUMBERED 500
Unless otherwise indicated, the prerequisites for 500-level courses are 15 cr. hrs. in courses in the same discipline numbered 200 or higher, 10 cr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 200 or higher in specified allied disciplines; or baccalaureate degree.

Poultry Marketing
(See Agr. Ec. 521.)
(Of offered in cooperation with the Dept. of Poul. Sc.)

593  (701)  U 2, 3 or 5
Individual Studies
H593 (Honors) may be available to students enrolled in a college honors program or eligible for enrollment.
Prereq.: 15 cr. hrs. 200-level courses or higher in Poul. Sc., Animal Sc., or Dairy Sc. and permission of instructor.

594  U 2, 3, or 5
Group Studies
A, W, Sp.  2 2-hr. cl.
Repeatable to a maximum of 10 cr. hrs.
Intensive study of selected areas of poultry science appropriate to the group and not provided in other courses.

GENERAL PREREQUISITES FOR COURSES NUMBERED 600
Unless otherwise indicated, the prerequisites for 600-level courses are 15 cr. hrs. in courses in the same discipline numbered 300 or higher, or 10 cr. hrs. in courses numbered 300 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 300 or higher in specified allied disciplines.

610  (501)  U 5
Avian Growth and Meat Production
Sp.  5 cl.
Prereq.: 200 and 430 or Zool. 220.
Not open to students with credit for 310.
Physiology of growth and development in avian species; environmental factors influencing growth. Jaap.

611  (503)  U 5
Avian Reproduction and Egg Production
Sp.  5 cl.
Not open to students with credit for 311.
Physiology of avian reproduction and egg production as affected by circadian rhythms, social stress, neuroendocrine mechanisms, ambient environment and immunological competence. Jaap.

Physiology of Reproduction and Growth
(See Dairy Sc. 612.)
(Of offered in cooperation with the Depts. of Animal Sc. and Poul. Sc.)

Laboratory in Reproductive Physiology and Artificial Insemination
(See Dairy Sc. 613.)
(Of offered in cooperation with the Depts. of Animal Sc. and Poul. Sc.)

589  (521)  U 5
Poultry Science Experience
Prereq.: Junior standing or higher and permission of instructor.
Practical experience, including completion of outlined program and written report, in an approved poultry establishment.
640 (613) U G 5
Prevention and Control of Avian Diseases
W. 3 cr., 2 2-hr. lab.
Prereq.: 5 cr. hrs. Microbiol., 10 cr. hrs. Chem.,
and 10 cr. hrs. Biological Sciences.
The etiology, recognition, prevention, and control of the
important diseases of poultry and related birds. Marsh.

650 (618) U G 5
Egg and Poultry Products Technology
Sp. 4 lec., 1 2-hr. lab.
Prereq.: 5 cr. hrs. Microbiol. and 10 cr. hrs. Chem.
The quality identification and maintenance; processing;
physical, chemical, microbiological and nutrient
properties and preservation of eggs and poultry products.

695 (750) U G 1-2
Seminar
Cook.

GENERAL PREREQUISITES FOR COURSES
NUMBERED 700
Unless otherwise indicated, the prerequisites for
700-level courses are 15 cr. hrs. in courses in the same
discipline numbered 400 or higher, plus additional
specified course(s) numbered 600 or higher.

Advanced Reproductive Physiology
(See Dairy Sc. 710.)
(Offered in cooperation with the Deps. of Animal Sc.
and Poul. Sc.)

720 U G 5
Genetics of Animal Populations
W. 5 cr.
Prereq.: 420 or Genetics 630, and 10 cr. hrs. in Math.
Not open to students with credit for Animal Sc. 720 or
Dairy Sc. 720.
(Cross-listed in the Deps. of Animal Sc. and Dairy Sc.)
Theory and practice of analyzing and altering the
genetic composition of animal populations. Swiger.

GENERAL PREREQUISITES FOR COURSES
NUMBERED 800 AND 900
Unless otherwise indicated, the prerequisites for 800
and 900-level courses are 30 cr. hrs. in courses in the
same discipline, or 20 cr. hrs. in the same discipline,
plus 25 cr. hrs. in specified allied disciplines.

810 G 3
Advances in Physiology of Domestic Animals
A, W, Sp. 4-hr. cr.
Prereq.: Acceptable courses in Physiol., Anat., Biochem.,
and permission of Instructor.
Not open to students with credit for Animal Sc. 810 or
Dairy Sc. 810.
(Cross-listed in the Deps. of Animal Sc. and Dairy Sc.)
810.01* Adrenal Function
A.
Brown and Gomes.
810.02* Endocrinology of Reproduction
W.
Gomes.
810.03* Immunology and Immunogenetics
Sp.
Hines.
810.04* Thyroid and Parathyroid Function
A.
Hibbs.
810.05* Mammalian Germ Cells
W.
Van Demark.
810.06* Biometry and Animal Performance
Sp.
Ludwick.

820 G 3
Current Topics in Animal Genetics
3 cr.
Prereq.: Acceptable courses in Animal Genetics,
Mathematics, and Statistics.
Repeatable to a maximum of 12 cr. hrs.
Not open to students with credit for Animal Sc. 820 or
Dairy Sc. 820.
(Cross-listed in the Deps. of Animal Sc. and Dairy Sc.)
820.01 Selection Index Theory
Sp.
Harvey.
820.02* Non-additive Genetic Variance
W.
Harvey.
820.03* Polymorphic Systems
W.
820.04* Simulation of Genetic Systems
W.
820.05* Cytogenetics of Animal Populations
W.
Fechheimer.
820.06* Physiological Indices in Animal Breeding
A.
820.07* Genetics of Threshold Characters
Sp.
Fechheimer, Harvey, Jaap, and Swiger.

830 G 3
Advanced Studies in Nutrition
Su, A, W, Sp. 3 or 4 cr.
Prereq.: Permission of instructor.
Not open to students with credit for Animal Sc. 830 or
Dairy Sc. 830.
(Cross-listed in the Deps. of Animal Sc. and Dairy Sc.)
830.01* Energy
A.
Conrad.
830.02* Minerals
W.
Cline.
830.03* Proteins
Sp.
Naber.
830.04* Vitamins
A.
Tyznik.
830.05* Lipids
W.
R. R. Johnson.
830.06* Laboratory Methods in Nutrition
Sp.
A.
~ Purser.
Preventive Medicine

Office: B-167 Starling Loving Hall, 320 West Tenth Avenue


585 (595) U 3
Epidemiology
A. 2 cl.
Prereq.: Microbiol. 210 or 509.

The Comprehensive Evaluation of the Patient
(See Med. 601, 602, and 603.)
[Emphasis on preventive relationship in individual and community health including environmental and occupational hazards and community resources for diagnosis, treatment and control of diseases.]

624 P 2
Quantitative Methods in Medicine
Sp. 2 cl.
Prereq.: Med. 1st yr. standing.
Principles of medical statistics and laboratory exercises in analysis of papers in the medical literature, with reference to experimental design and numerical reasoning. Keller and Staff.

735 P 2
Advanced Preventive Medicine
1 month, offered Oct. and Feb.
Prereq.: Med. 4th yr. standing.
Ecology of health and disease in the modern community; environmental health; public health methods; medical nutrition; and biometric application. Keller and Staff.

753 P 6
Principles of Public Health Administration
1 month, offered all months except June.
Prereq.: Med. 3rd or 4th yr. standing.
Administration, organization, and function of Public Health agencies; principles of sanitation, food inspection, immunization, and school health. Keller and Staff.

763 P G 1
Medicolegal Problems in Industry
A. 1 1-hr. cl.
Prereq.: Grad. standing in Prev. Med., or permission of instructor.
Legal relationships among employers, physicians, and employees; liability in case of injury; evaluation of disability; workmen's compensation; malpractice. Nick.

764 P G 3
Design of Biomedical Investigations
W. 2 2-hr. cl.
Prereq.: Med. 3rd yr. standing or grad. standing in Prev. Med., or permission of instructor.
Design of studies in biomedical area; formulation of hypotheses; sampling; planning observations and measurements; selection of statistical techniques; testing of hypotheses. Keller and Billings.

793
Individual Studies in Preventive Medicine
1, 2, 3, or 4 months, offered all months except June.
Prereq.: Med. 3rd yr. standing, or grad. standing in Prev. Med., or permission of instructor.
Repeatable to a maximum of 24 cr. hrs. for professional credit.

793.01 Aerospace Medicine
Billings.

793.02 Biometrics
Keller.

793.03 Clinical Environmental Medicine
Schulte.

793.04 Environmental Health
Schulte.

793.05 Epidemiology
Keller.

793.06 Nutrition
Lewis.

793.07 Occupational Medicine
Schulte.

793.08 Community Health
Keller.
Residency in Preventive Medicine
12 months full time, beginning July 1.
Prereq.: Appointment as Resident, University Hospital.
Repeatable to a maximum of 72 cr. hrs.
Assignment to accredited area for training in Aerospace and Occupational Medicine.

Principles of Aerospace Medicine
Su (2nd term). 1 2-hr. cl.
Prereq.: Permission of instructor.
History and background of Aerospace Medicine; government regulatory agencies (FAA and CAB); civilian and military aerospace medical administration, research and practices; field trips to aerospace facilities. Billings.

Principles of Occupational Medicine
A. 1 2-hr. cl., field trips arr.
Prereq.: Permission of instructor.
Intramural and extramural relationships of the physician in industry; physical facilities, personnel, and equipment of industrial medical departments; departmental budgeting; employee examinations, health maintenance programs; safety programs. Schulte.

Public Health Organization
Sp. 1 2-hr. cl.
Prereq.: Permission of instructor.
History and development of Public Health agencies; legal bases of public health law; administrative structure of official and voluntary agencies and their relationships to the complex of health and medical services in the community. Keller.

Environmental Toxicology I
A. 3 1-hr. cl.
Prereq.: Permission of instructor.
effect of the environmental toxins upon the organism; evaluation of testing methods, study of intermediary metabolism and detoxification; and introduction to chemically induced teratology and carcinogenesis. Weir and Shillito.

Environmental Toxicology II
W. 3 1-hr. cl.
Prereq.: 820 or equiv., or permission of instructor.
evaluation of the effects of environmental pollution on the organism; including noxious gases, vapors, and particulates. Schulte and Weir.

Environmental Toxicology III
Sp. 3 1-hr. cl.
Prereq.: 821 or equiv., or permission of instructor.
Continuation of 821 covering the effects of metals and their compounds, pesticides, plastics, and plasticizers, and the problem involved with cosmetics, food additives, and residues. Weir and Schulte.

Principles of Hyperbaric Medicine
Sp. 1 3-hr. cl.
Prereq.: Permission of instructor.
Basic considerations of the etiology, diagnosis, prevention, and treatment of hyperbaric illnesses including caisson disease, air embolism, nitrogen narcosis, and oxygen poisoning. Schulte.

Clinical Aerospace and Occupational Medicine I
W. 2 1½-hr. cl.
Prereq.: Permission of instructor.
Medical qualification for employment or for flying, from viewpoints of major clinical specialties; general aerospace and industrial medical problems; aerospace and ground safety programs. Ellingson and Staff.

Clinical Aerospace and Occupational Medicine II
Sp. 2 1½-hr. cl.
Prereq.: 840 or permission of instructor.
Continuation of 840. Ellingson and Staff.

Medical Aspects of Human Engineering
A. 2 1½-hr. cl.
Prereq.: 820, Psychol. 840, or permission of instructor.
Consideration of interfaces between medicine, physiology, psychology, and engineering in the design of complex systems operated by man; organization and administration of human factors groups. Wick and Staff.

Seminar in Preventive Medicine
Prereq.: Permission of instructor.
Repeatable to a maximum of 8 cr. hrs.
850.01 Selected Topics in Occupational or Aerospace Medicine
Ellingson and Staff.

Epidemiologic Methods
Su (2nd term). 3 1-hr. cl.
Prereq.: Permission of instructor.
Principles of epidemiology with special emphasis on methods employed in current epidemiologic studies of chronic diseases. Keller and Staff.

Behavioral Research in Selected Health Areas
A. 1 2-hr. cl.
Prereq.: Permission of instructor.
A survey of behavioral research in selected health areas; special emphasis on coronary heart disease, cigarette smoking, and health and illness behavior. Lanese and Banks.
Psychiatry

Office: 071 Upshur Hall, 473 West Tenth Avenue

Professors Gregory (Chairman), Coddington, Corrin, Fischer, Green, G. Harding, Sr. (Emeritus), Kaelbling, Liss, Marks, Michael, Palmer, Patterson, Fine, and Siegel; Associate Professors Axline, Brandis, Fox, Goldman, Haas, G. Harding, Jr., Kangas, W. Knopp, Lehman, McCluer, McGough, Missildine, Monroe, H. Pariser, Parker, Stevenson, Todd, Veczoli, Wheldon; Assistant Professors Borelli, Burd, Carlton, Corlis, Gardner, Goud, Gove, Gwynne, C. Hall, C. Harding, H. Harding, Hundsziak, Johnston, King, E. Knopp, Kuh, Larmont, Lindner, Mattis, New, Persons, Taylor, Sikking, Smith, and Incas, Stroz, and Weaver; Instructors Baumgartner, Duncan, Hathem, Johnson, Leuchter, Maglisho, Manis, Martin, Miller, Podobnikar, Pugliese, Randolph, Schmidt, Stimson, Tombov, G. van Sickel, M. van Sickel, and Vermueilen.

Comprehensive Evaluation of the Patient

(See Med. 601, 602, and 603.)
[Experiences with the emotionally disturbed in various clinical areas emphasizing interview techniques; dynamic and descriptive approaches to concepts of emotional growth, development, and pathology.]

708 P.G. 1
Psychopathology I

A. 1 cl.
Prereq.: Permission of instructor.
A sequence course in Autumn, Winter, and Spring Quarters reviewing the clinical, etiological, and psychodynamic aspects of the common psychiatric disorders.

709 P.G. 1
Psychopathology II

W. 1 cl.
Prereq.: 708.
Continuation of 708.

710 P.G. 1
Psychopathology III

Sp. 1 cl.
Prereq.: 708 and 709.
Continuation of 709.

711 P.G. 1
Introduction to Group Psychotherapy

Sp. 1 cl.
Prereq.: Permission of instructor.
Rationale for the use of group psychotherapy and fundamental techniques needed in starting and conducting a psychotherapeutic group.

712 P.G. 2
Advanced Psychotherapy and Family Therapy I

A. 1 cl.
Prereq.: 710 and 741 or equiv.
Family therapy; communication systems, family rules and structure; analysis of therapist-patient relationships.
Advanced Psychotherapy and Family Therapy II
W. 1-2 hr. cl.
Prereq.: 712 or equiv.
Continuation of 712.

Behavioral Science I
Sp. 1 cl.
Prereq.: Permission of chairman.
Intensive coverage of scientific research procedures in the behavioral sciences, including the nature of the hypothesis, experimental designs, techniques of controls, and some basic parametric and nonparametric statistics.

Behavioral Science II
Prereq.: 714.
Continuation of 714.

Behavioral Science III
Prereq.: 715.
Problems and methods of personality measurements with emphasis on objective approaches to personality assessment.

Neuropathological Basis of Mental Disorders
Sp. 2 cl.
Prereq.: Permission of chairman.
Emphasis on new trends in neuropathology as illustrated by results of recent research; considered as a reevaluation of established and hypothetical etiological mechanism of diseases affecting the nervous system.

Psychiatric Theory I
A. 1 cl.
Prereq.: Permission of chairman.
Psychiatric theories of personality, nature and etiology of psychopathology and psychotherapy, plus relevant historical material; emphasizes Freudian psychoanalytic theory and its precursors.

Psychiatric Theory II
W. 1 cl.
Prereq.: 718 and permission of chairman.
Continuation of 718.

Psychiatric Theory III
Sp. 1 cl.
Prereq.: 719 and permission of chairman.
Psychiatric theories of personality, nature and etiology of psychopathology and psychotherapy, plus relevant historical material; emphasizes other major theorists neither classical, psychoanalytic, nor Neo-Freudian.

Neuroendocrine Bases of Behavior
A. 1 cl.
Prereq.: Permission of chairman.
Normal and pathologic operants of selected biologic control systems examined in terms of cybernetics, relating anatomy, physiology, and pharmacology to overt behavior.

Forensic Psychiatry
Sp. 1 cl.
Prereq.: M.D. degree and permission of chairman.
Psychiatric testimony in criminal and civil legal procedures; determination of competency and indications for involuntary commitment; legal responsibilities of the psychiatrist.

Community Psychiatry
Su. 2 cl.
Prereq.: Permission of chairman.
A review of the recent growth, development, and expanding programs in the field of community psychiatry.

Psychiatric Applications of Psychological Tests
Su. 1 cl.; or Su (2nd term). 2 cl., 2 lab. hrs. optional.
Prereq.: Permission of instructor.
Psychological testing procedures and their use in clinical psychiatry (intelligence testing, personality evaluation, and neuropsychological assessment).

Clinical Psychiatry
Prereq.: Med. 3rd or 4th yr. standing
Must repeat to 12 cr. hrs.
Psychopathology and dynamisms of psychiatric syndromes; diagnosis, treatment, and interview techniques in ward work, case studies, conferences, and seminars; correlations of medical, psychological, and social factors.

Basic Psychotherapy I
A. 1 cl.
Prereq.: Permission of chairman.
Basic concepts of psychotherapy, theory, and technique, with review of the development and structure of the personality.

Basic Psychotherapy II
W. 1 cl.
Prereq.: 740.
Continuation of 740; a study of basic concepts of psychotherapy, theory, and technique, with review of the development and structure of the personality.
742 Child Psychiatry
Su. 1 2-hr. cl.
Prereq.: Permission of instructor.
Diagnosis and therapy in child psychiatry; etiologic forces that contribute to the development of mental illness in children and their families.

745 History of Psychiatry I
A. 1 cl.
Prereq.: Permission of chairman.
The development of psychiatric concepts and practices through the ages; study of biographical sources and significant writings.

746 History of Psychiatry II
W. 1 cl.
Prereq.: 745 and permission of chairman.
Continuation of 745.

750 Psychiatric Aspects of Mental Retardation
Su. 1 cl., (2 lab. hrs. optional).
Prereq.: Permission of chairman.
Theoretical and clinical aspects of mental retardation as related to psychiatry.

751 Anatomical Substrates of Behavior
A. 1 cl.
Prereq.: Anat. 543 and 683 or equiv.
A review of topography and discussions of the nervous system as a substrate of higher nervous functions and seat of mental disturbances.

760 Clinical Hypnosis and Hypnotherapy
Sp. 1 cl., 4-hr. lab. optional.
Prereq.: 710 or equiv. and permission of instructor.
Theoretical and clinical aspects of hypnosis, with experience in techniques and applications in psychotherapy. Gwynne.

783 Individual Studies in Biological Psychiatry
1, 2, or 3 months; P 6, 12, 18
offered all months.
Prereq.: Med. 3rd or 4th yr. standing and permission of chairman.
  a. Biological Psychiatry
  b. Experimental Psychology
  c. Learning and Motivation
  d. Neuroendocrine and Other Correlates of Conditioned Reflexes and Hypnosis.
  e. Neurochemistry and Neuropharmacology
  f. Neuroendocrinology
  g. Neuropathology
  h. Neurophysiology

784 Individual Studies in Clinical Psychiatry
1, 2, or 3 months; P 6, 12, 18
offered all months.
Prereq.: Med. 3rd or 4th yr. standing and permission of chairman.
  a. Advanced Psychotherapy
  b. Experimental Psychopathology
c. Mental Health Administration
d. Psychiatric Test Procedures
e. Psychosomatic Medicine
f. Social Psychiatry
g. Social Psychology
h. Clinical Psychiatry
i. Child Psychiatry

790 Residency in Psychiatry
12 months full time, beginning July 1.
Prereq.: Appointment as Resident, University Hospital.
Repeatable to a maximum of 216 cr. hrs.
Rotation through inpatient and outpatient services in the diagnosis and treatment of psychiatric disorders of adults and children; rounds, conferences, and individual supervision.

801 Scientific Basis of Clinical Psychiatry
Su (2nd term). 6 cl. (4 lab. hrs. optional).
Prereq.: M.D. and permission of instructor.
Principles of case study, interviewing, history-taking, and diagnosis; rationale, indications, contra-indications, and precautions for physiological and psychological treatment. G. Harding, Jr.

850 Seminars in Psychiatry
Prereq.: Permission of chairman and instructor.
Repeatable to a maximum of 6 cr. hrs.
  a. Clinical Psychiatry
  b. Group Therapy
  c. Psychotherapy
d. Psychiatric Literature
e. Child Psychiatry

900 Psychiatry Research
Prereq.: M.D. and residency in Psychiatry.
Research for thesis purposes only.
Psychology

Office: 321 Arps Hall, 1945 North High Street

Professors Wherry (Chairman), Angelino, Briggs, Brock, Cassiday, Cook, Fletcher, Horrocks, Huelman, Johnson, Kaswan, MacMillin, Marks, Meyer, Osipow, Pepeynsky, Robinson, Schmidt, Siegel, Smith, Stewart, Thompson, Wana, and Wickers; Associate Professors Campbell, Clark, Davis, Erickson, Ernst, Fox, Greenwald, Helper, Kangas, Latane, Leland, Monroe, Ostrom, Rie, Stafford, and Walsh; Assistant Professors Bersoff, Gardner, Goldrich, Hakel, Hothersall, Isaac, Jones, Kaul, Ketchum, Libby, Mirels, Morris, Nolan, Owen, Ruma, Schwebel, Shulman, Spitzner, Taylor, and Weaver; Adjunct Assistant Professor Watson; Instructors Roberts, Rodgers, and Russell.

100 (401) U 5
General Psychology
Su, A, W, Sp. 5 cl.
Introductory psychology, a prerequisite to advanced courses; the application of the scientific method to behavior; topics include learning, motivation, perception, personality, physiological basis of behavior.

101 (402) U 5
General Psychology
A, W, Sp. 5 cl.
Prereq.: 100.
Continuation of 100 with further emphasis on the development of a scientific attitude toward personal psychological problems in the fields of learning, thinking, intelligence, and personality.

110t (408) U 3
Mental Hygiene
3 cl.
Prereq.: 100.
Not open to seniors.
Survey of the principles of mental hygiene, social and emotional adjustment, and personality in light of the principles of mental hygiene; adjustment problems of the college student.

120 (411) U 3
Psychology of Personal Effectiveness
Su, A, W, Sp. 2 cl., 1 2-hr. lab.
A survey of theories and practices designed to improve higher level skills in reading, perception, learning, and adjustments.

130 (581) U 1-4
Advising College Students
Prereq.: Third qtr. freshman or above and permission of instructor.
Repeatable to a maximum of 4 cr. hrs.
Selected students will study the dynamics of and have experiences in advising students concerning their scholastic, social, and personal development.
Instructors Rodgers, Russell, Roberts, and Staff.

210 (404) U 5
Educational Psychology for Medical Personnel
Sp. 5 cl.
Prereq.: 100 and Zool. 404.
Not open to students with credit for 230.

Human capacities, abilities, interests, individual differences, and total development through the life span; aspects of learning and personality of interest to medical personnel.

220 (508) U 3
Quantitative and Statistical Methods in Psychology I
Su, A, W, Sp. 3 cl.
Prereq.: 100 or 300, and Math. 116 and 117, or equiv.
Elementary presentation of probability, descriptive, and inferential statistics and methods of measurements relevant to contemporary psychology.

221 U 3
Quantitative and Statistical Methods in Psychology II
W, Sp. 2 cl., 1 2-hr. lab.
Prereq.: 220.
Not open to students with less than a grade of C in 220.
A concentrated examination of the applications of statistical tools in inference and theory construction in contemporary psychology.

230 (407) U 5
Introduction to Educational Psychology
Su, A, W, Sp. 5 cl.
Prereq.: 100.
Not open to students with credit for 231.
Facts and principles of human development and learning are applied to the problems of education; scientific evidence in the solution of educational problems is stressed.

300 (403) U 5
Introductory Psychology
A, W. 5 cl.
Prereq.: 10 cr. hrs. of science.
Not open to students with credit for 310.
An introduction to psychology for students with science background; topics covered similar to 100.

310 (504) U 3
Basic Psychology: Perception
Su, A, Sp. 3 cl.
Prereq. or concur.: 220.
Theory, methods, and physiological correlates of sensory and perceptual processes; emphasis on the relation of behavior to stimulus variation. Isaac and Owen.

311 (505) U 3
General Psychology: Motivation and Action
A, W. 3 cl.
Prereq. or concur.: 220.
A behavioristic presentation of experimental work on learning and motivation. Goldrich and Spitzner.

312 (506) U 3
General Psychology: Learning and Thinking
W, Sp. 3 cl.
Prereq.: 311.
The principles developed in 311 are extended to complex human behavior, especially verbal. Johnson and Shulman.
320  (521)  U 3
Social Psychology
A, W, Sp.  3 cl.
Prereq.: 10 cr. hrs. in Psych.
The influence of group processes, organizational variables, and culture upon the social modification of basic drives, attitudes, and language. Latane, Ostrom, and Greenwald.

330  (541)  U 3
Psychology of Abnormal Behavior
Su, A, W, Sp.  3 cl.
Prereq.: 10 cr. hrs. in Psychol.
A consideration of the symptomologies, etiologies and therapies of the major neuroses and psychoses with special emphasis on psychoanalytic theories and methods. Nolan and Weaver.

340  (507)  U 3
Genetic Psychology
Su, Sp.  3 cl.
Prereq.: 9 cr. hrs. in Psychol.
The facts of human development with some phylogenetic perspective; topics cover physical and mental development, innate tendencies, mental states, and personality development. Clark and Stafford.

500  (601)  U G 3
Experimental Psychology
A, W, Sp.  2 cl., 2 lab. hrs. arr.
Prereq.: 310 or 312 or permission of instructor.
The experiments are selected both for general and cultural values and for preparation for technical research in experimental psychology. Spitzner.

501  (605)  U G 3
Physiological Psychology
W.  3 cl.
Prereq.: 101 or 300.
Some physiological correlates of psychological phenomena; the properties of integrated organ systems, with emphasis upon the characteristics of their elements; consideration of psychosomatic abnormalities. Goldrich.

502  (606)  U G 3
Advanced Physiological Psychology
Sp.  3 cl.
Prereq.: 501.
Further physiological correlates of psychological phenomena; sensory and motor processes will be special topics. Goldrich.

504  (667)  U G 3
Psychology of Music
W.  3 cl.
Prereq.: Permission of instructor.
Psychological factors in musical learning, memorization, rhythm, harmony, form, tone color, interpretation, dictation, and music talent. Poland.

505  (646)  U G 3
Contemporary Viewpoints in Psychology
W.  3 cl.
Prereq.: 16 cr. hrs. in Psychol.
A consideration of the development of modern scientific psychology from its roots in the school of the 19th century to its contemporary status. Hothersall.

510  (608)  U G 4
Elementary Statistical Methods
Su, A, W, Sp.  2 cl., 4 lab. hrs.
Prereq.: Math. 117 or permission of instructor.
Introduction to statistics and applications to psychological and educational research; rationale, computation, and interpretation. Fotheringham, Isaac, Jones, and Wherry.

511  (613)  U G 3
Psychological Testing
Su, A, Sp.  2 cl., 1 lab. hr.
Prereq.: 10 cr. hrs. in Psychol.
An overview of theoretical and practical aspects of the assessment and prediction of human behavior; topics include achievement, intelligence, personality, attitudes, interests and interpersonal relations. Stafford.

512  (704)  U G 3
Test and Measurement in Speech
Sp.  3 cl.
Prereq.: 510.
Procedures in developing, using, and evaluating tests in speech education, radio and television, theatre, speech and hearing disorders, and general communication. Fotheringham.

520  (677)  U G 4
Experimental Social Psychology
W.  2 cl., 4 lab. hrs.
Prereq.: 320, 510, and permission of instructor.
Repeatable to a maximum of 12 cr. hrs.
Typical experiments in such social psychological areas as attitude change, group processes, and group influences upon the individual. Ostrom.

521  U G 3
Personnel and Organizational Psychology
A, Sp.  3 cl.
Prereq.: 220 or permission of instructor.
Influence of individual and organizational factors on performance of complex tasks; effects of task involvement on the individual; relationships between organizations and their clients. Ketchum.

530  (678)  U G 3
Psychology of Personality
Su, A, W, Sp.  3 cl.
Prereq.: 10 cr. hrs. in Psychol.
A theoretical approach to the problems of personality development and functioning; emphasis is given to a critical evaluation of the major theories of personality. Mirels.

531  (695)  U G 3 or 5
Clinical Psychology
A, W, Sp.  3 cl., 2 optional lab.
Prereq.: 15 cr. hrs. in Psychol.
Discussion of the field of clinical psychology; its methods, its problems and its use in guidance, education, hospitals, industry, and other areas. Schwebel.
539  (690)  U G 3
Mental Hygiene for Professional Workers
Su, A, W, Sp.  3 cl.
Prereq.: 10 cr. hrs. in Psych.
Not open to students with credit for 640.
The determinants of maladjustment and principles
used in the prevention of maladjustment for teachers,
personnel workers, social workers, psychologists,
occupational therapists, and other professional groups.
Fletcher, Kaul, and Stewart.

540  (659)  U G 3
Counseling Psychology: An Introduction
Su, A, W, Sp.  3 cl.
Prereq.: 10 cr. hrs. in Psych.
For students interested in counseling and personnel
work: discussion of counseling psychology, counseling,
and testing. Walsh, Kaul, and Robinson.

541  (640)  U G 3
Educational and Vocational Appraisal
Su, W.  3 cl.
Prereq.: 10 cr. hrs. in Psych.
Theory and techniques of appraisal of individual
characteristics as related to the formulation of future
educational and vocational plans. Walsh.

542  (689)  U G 3
Vocational Psychology
Su, Sp.  3 cl.
Prereq.: 10 cr. hrs. in Psych.
Survey of the psychological aspects of work and their
implication for vocational development; the use of
labor force and occupational information in vocational
choice. Campbell and Kaul.

550  (663)  U G 3
Psychology of Childhood
Su, A, Sp.  3 cl.
Prereq.: 10 cr. hrs. in Psych.
Psychological development from birth to age 12;
influence of school, family, and other out-of-school
activities; provision for the child's psychological needs.
Angelino and Werner.

551  (610)  U G 3
Adolescence
Su, A, W, Sp.  3 cl.
Prereq.: 10 cr. hrs. in Psych.
A study of the outstanding characteristics of the
adolescent, the educational and social problems
arising at this period, and means for dealing with the
problem. Clark and Angelino.

552†  (666)  U G 2-3
Studying the Individual Child
Sp.  1 cl., lab. hrs.
Prereq.: A course in developmental psych. and
permission of instructor.
Repeatable in the following qtr. to a maximum of
5 cr. hrs.
The student is assigned a normal child for individual
study; observation of the child's behavior at home, at
school, in varied social situations (using tests where
appropriate); coordination of information obtained
from records and interviews and a weekly report.
Wenar.

560  (676)  U G 3
Educational Psychology
Su, W.  3 cl.
Prereq.: 10 cr. hrs. in Psych.
Critical appraisal of the implications for education of
modern psychological findings in advanced educational
psychology. Libby.

570  (609)  U G 3
Exceptional Children: General Survey
Su, A, W.  3 cl.
Prereq.: 10 cr. hrs. in Psych.
Exceptional children and their problems including
intellectual deviant; the physically disabled and hard of
hearing children with speech problems, other
physically handicapped and emotionally disturbed.
Cassidy and Staff.

599  (700)  U G 3
Honors Course
A, W, Sp.  3 cl.
Prereq.: Permission of departmental Undergraduate
Program Committee.
Repeatable to a maximum of 9 cr. hrs.
A program of readings, conferences, and reports
selected to provide maximum individual development
and preparation for graduate study in the field. Owen,
Erickson, and Shulman.

600  (626)  U G 4
Psychology of Learning
Su, A.  4 cl.
Prereq.: 101 or equiv.
The principles that underlie the discovery, fixation, and
retention of new modes of human behavior; emphasis
on theoretical formulation of the necessary conditions
of learning and forgetting. Johnson and Wickens.

601  (655)  U G 3
Comparative Psychology
A.  2 cl., 1 2-hr. lab.
Prereq.: 20 cr. hrs. in Psychol. or permission of
instructor.
Principles of animal behavior, with emphasis upon the

603  (687)  U G 3
Visual Perception
W.  3 cl.
Prereq.: 310 or permission of instructor.
Not open to students with credit for 593.
Phenomena, theory, and methods in the study of
vision and visual perception as a model for sensory
and perceptual processes. Owen.

610  (629)  U G 3
Introduction to Quantitative Learning Models
A.  3 cl.
Prereq.: 312 and 510 or equiv.
A critical review of model building in psychology with
special emphasis upon mathematical techniques;
detailed examination of two or three current
mathematical or statistical models. Erickson.
611 (680) U G 3
Educational Testing
W. 3 cl.
Prereq.: 15 cr. hrs. in Psychol.

612 (713) U G 3
Laboratory and Psychological and Educational Measurement
A. 1 cl., 4 lab. hrs.
Prereq.: 511 or 611 or equiv.
Repeatable to a maximum of 6 cr. hrs.
612.01† Administration and Scoring Procedure for Group Tests
612.02† Construction of Achievement Tests
A.
Cook.
612.03† Construction of Aptitude and Ability Tests
612.04† Construction of Personality Tests

620 (623) U G 3
Human Performance
A, Sp. 3 cl.
Prereq.: 310 and 312 or permission of instructor.
Traces the flow of information through the human performer; topics include attention, memory, decision making, and feedback. Shulman.

621 (637) U G 5
Psychology of Individual Effectiveness
W. 5 cl.
Prereq.: 521 or grad. standing.
Measurement of individual and organizational attributes; models for predicting effectiveness; perception, learning, information processing, decision-making as processes determining effectiveness. Hakel.

622 (639) U G 3
Psychology of Organizational Effectiveness
Sp. 3 cl.
Prereq.: 521.
Central concepts of organization, and analysis of underlying behavioral assumptions; social processes as constraints on organizations; measurement of organizational outcomes; theory of organizational processes. Morris.

623 (644) U G 3
Human Motivation
W. 3 cl.
Prereq.: 220 or permission of instructor.
Overview of theory and research in the explanation of the direction and level of human behavior in real life settings. Morris.

630 (679) U G 3
Psychology of Public Attitudes
W. 3 cl.
Prereq.: 220 and 220 or equiv.
Attitude organization and change; study of the determinants of attitude. Ostrom.

631 U G 3
Differential Psychology
A, W. 3 cl.
Prereq.: 220 or 510.
Critical consideration of the traits wherein individuals and groups differ; factual data as to differences between men and women, races and ethnic groups, social classes, etc. Libby.

632† (648) U G 3
Prejudice and Personality
A. 3 cl.
Prereq.: 220.
Social psychological theories of group conflict; personality dynamics in prejudice; approaches to the reduction of intergroup hostility.

633 U G 2
The Psychology of the Audience
Sp. 2 cl.
Prereq.: 630 and 10 cr. hrs. in Speech or permission of instructor.
Descriptive and experimental studies of audience behavior; dimensions and patterns of audience stimulation; measurement of effects of communication; communication analysis; listening. Knower.

635 U G 3
Psychology in Eastern Europe
W. 1 3-hr. cl.
Prereq.: 10 cr. hrs. in Psych. or grad standing or permission of instructor.
A survey of the approaches and bibliography of the psychology of human behavior with emphasis on the USSR. Brock.

651 (683) U G 3
Psychology of Reading
Su, Sp. 3 cl.
Prereq.: 10 cr. hrs. in Psychol.
Psychological analysis of the reading process; the relationship of this to teaching and remedial methods; discussion of remedial reading techniques. Huelsman.

661† (670) U G 3
Psychology of Aging
W. 3 cl.
Prereq.: 10 cr. hrs. in Psychol.
A survey of research and theory related to psychological changes through adulthood and old age. Clark.

662 U G 3
Psychology of Creativity
A. 3 cl.
Prereq.: 15 cr. hrs. in Psychol. or permission of instructor.
A critical examination of conceptual, theoretical, and methodological problems related to the systematic study of creativity; special attention to background factors related to creative behavior. Clark.
The Psychology of Speech
W. 3 cl.
Prereq.: 10 cr. hrs. in Psychol. and 10 cr. hrs. in Speech.
Descriptive and experimental studies of speech processes and activities; learning, personal and social adjustments, vocal and visible symbolism, language and semantics, thinking, speech behavior patterns. Knowler.

Principles and Economy of Learning
A. 3 cl.
Prereq.: Grad. standing or 10 cr. hrs. Psychol.
The psychological principles involved in the practical control of learning activities, especially the more complex forms as seen in school and in industrial training. Libby.

The Intellectual Deviate
Su, W. 3 cl.
Prereq.: 570 or permission of instructor.
Theory and concepts of mental retardation, slow learner, intellectually gifted; causation, diagnosis, and treatment of social, personal, and educational problems of children so labeled. Cassidy.

Educational Disability
Su, A. 3 cl.
Prereq.: 570 and 651 or permission of instructor.
An overview of theory and practice including causes, diagnostic procedures, remediation, and instruction materials. Huesman.

Principles of Treating the Problem Child
Su, A. W. 3 cl.
Prereq.: 15 cr. hrs. in Psychol.
Methods used in dealing with behavior and personality problems of children. Gloss.

Psycho-Educational Diagnostic Teaching
Prereq.: 651 and permission of instructor.
Repeatable to a maximum of 3 cr. hrs.
Using test materials in the diagnosis of special disabilities in school work; practice with remedial procedures. Huesman.

Delinquent Children
A. 3 cl.
Prereq.: 15 cr. hrs. in Psychol.
The meaning and significance of delinquency in a cultural context; its psychological basis from a theoretical and empirical framework; present modes of detection and treatment. Angeline.

Individual Studies
Prereq.: 15 cr. hrs. in Psychol. and permission of instructor.
Repeatable to a maximum of 30 cr. hrs.
Individual reading or research projects by special agreement between instructor and student.

Introduction to National Security
(See Nat. Sec. Pol. S. 702.)

Research Principles and Techniques in National Security
(See Nat. Sec. Pol. S. 786.)

Learning-Disabled Children
Su, W. 3 cl.
Prereq.: 570 or permission of instructor.
Critical study of learning-disabled children with emphasis on neurological-perceptual factors, in contrast with emotional, cultural, and educational factors in learning disability. Lema.

Laboratory in Industrial Psychology
1 cl., 4 lab. hrs.
Prereq.: 510 or equiv. and permission of instructor.
Repeatable in different sections to a maximum of 12 cr. hrs.

Attitude and Morale Scales
W.
Ostrom.

Measurement of Individual Effectiveness
W.
Ostrom.

Measurement of Organizational Effectiveness
A.
Morris.

Merit Rating
W.
Wherry.

Group Studies
Su, A, W, Sp. 3 cl.
Prereq.: 15 cr. hrs. in Psychol. at 500 level or above and permission of instructor.
Repeatable to a maximum of 30 cr. hrs.
The topics vary from quarter to quarter and will be announced at least one month in advance.

Advanced Experimental Laboratory
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Advanced training in the experimental and quantitative methods in the several areas of general experimental psychology and comparative psychology. Exper.

Seminar in National Security Research
(See Nat. Sec. Pol. Sci. 801.)
801 (811) G 4
Advanced Theoretical Psychology
Sp. 4 cl.
A description and evaluation of the major advanced psychological behavior theories. Wickens.

802 (841) G 3
Advanced Psychology of Motivation
Sp. 3 cl.
Prereq.: 20 cr. hrs. in Psychol. including 311 or 600 or permission of instructor.
An evaluation of the experimental and theoretical material on: physiological drives; development and maintenance of secondary motives; perception and motivation, conflict. Spitzner.

803 (845) G 3
Theories of Perception
Sp. 3 cl.
Prereq.: 310 and 501 or permission of instructor.
Theoretical interpretations of the phenomena, problems, and experimental data of perception, including influences of development and learning. Owen.

804 (844) G 3
Advanced Comparative Psychology
Sp. 3 cl.
Prereq.: 601.
Contemporary literature in comparative psychology. Hothersall.

805† (843) G 3
Psychophysiology of the Special Senses
3 cl.
Prereq.: 502 or 503 or permission of instructor.
A survey of the basic physiology of the senses and the peripheral nervous system; emphasis on receptor mechanisms and neural coding processes.

806 G 3
Neuropsychology I
A. 3 cl.
An introduction to the principles governing neural integrative mechanisms; morphology of nervous systems of the vertebrates; transmission in individual neurons; properties of junctions in integrative networks; elementary laws or reflex action. Meyer.

807 G 3
Neuropsychology II
W. 3 cl.
Prereq.: 806.
Functional differentiation of the nervous systems of vertebrates; properties of principle division of the brain; organizations of the forebrain; mechanisms of sleep and waking rhythm; mechanisms of perception. Meyer.

808 G 3
Neuropsychology III
Sp. 3 cl.
Prereq.: 807.
Neural mechanisms of motivation and behavioral plasticity; control of major cyclical phenomena, including hunger, thirst, and reproduction; reactions to aperiodic and continued stresses; mechanisms of the learning process. Meyer.

809 (853) G 3
History and Systems of Psychology
A. 3 cl.
Prereq.: 15 cr. hrs. in Psychol.
Development of psychology from the philosophical antecedents to its present status as a science and a profession; assignments in original sources as far as possible. Hothersall.

810 (825) G 5
Methodological Foundations of Experimental Psychology
W. 5 cl.
Problems of definition of psychological concepts, formulation and testing of hypotheses, theory, construction, and formulation of empirical generalization with reference to design of psychological experiments. Johnson.

811 (802) G 2
Seminar in Experimental Psychology
Su, A, W. 2 cl.
Prereq.: Permission of instructor.
Exper.

812† (805) G 1
Contemporary Psychological Literature
Sp. 1 cl.
Briggs.

816 G 3
Human Performance Theory
W. 3 cl.
Prereq.: 620 or permission of instructor.
Research and theory on the discrete and on the continuous cases of human information processing; topics include input processes, central processing functions, and output processes. Briggs.

817 G 3
Seminar in Human Performance
A, W, Sp. 3 cl.
Prereq.: Permission of instructor.
Briggs, Shulman, and Wise.

819 (807) G 2
Seminars in Industrial Psychology
2 cl.
Prereq.: Permission of instructor.
A. Psychology of Individual Effectiveness.
   a. Ketchum.
b. Psychology of Organizational Effectiveness.
   W. Morris.
c† Human Motivation.
   W.
d. Theoretical Developments and Issues.
   Sp.
   Ketchum.
   A, Sp.
   Hakel and Morris.
821  G 2
Research Seminar in Industrial Psychology
A, W, Sp. 2 cl.
Prereq.: Permission of instructor.
Repeatable to a maximum of 12 cr. hrs.
Advanced training in the psychology of individual and
organizational effectiveness, emphasizing quantitative
and experimental methods. Hakei, Ketchum, and
Morris.

822  G 3
Psychological Assessment
A. 3 cl.
Prereq.: 510.
A critical survey and evaluation of concepts and
techniques of assessment of intelligence, special
aptitudes, and personality. Stafford.

823  (855)  G 3
Theory of Test Construction
W. 3 cl.
Prereq.: 511 or 611 or equiv.
Review of major approaches including traditional
mental test theory, assessment theory, and decision
theory in relation to constructing and use of various
types of tests. Stafford.

824  (804)  G 2
Seminar in Psychological Measurement
2 cl.
Prereq.: Permission of instructor.
824.01† The Measurement of Cognitive Functions
W. Stafford.
824.02 Models for Psychophysics
W. Isaac.
824.03 Models for Psychological Scaling
Sp. Isaac.
824.04† Models for Psychological Testing
824.05 Models for Interpersonal Analysis
A. Ostrom.

827  G 4
Inferential Statistics in Psychology
A. 4 cl.
Prereq.: 510 or equiv.
A coverage of statistical inference and prediction in
psychological research including parametric and
non-parametric methods and concepts of
measurement and probability. Briggs.

828  (815)  G 4
Correlational Analysis
Sp. 4 cl.
Prereq.: 510 or permission of instructor.
Techniques and rationale of using quantitative and
qualitative data for prediction; test and battery
analysis and validation. Wherry.

829  (814)  G 4
Quantitative Foundations
of Psychological Statistics
W. 4 cl.
Prereq.: 510 or equiv.
Principles and techniques for deriving statistical
equations; their modification to handle special cases;
clarifying assumptions and their application. Erickson.

830  (819)  G 3
Machine Programming for Psychological Research
Su. 3 cl.
Prereq.: 628, Math. 241, and permission of instructor.
An introduction to mnemonic symbolic language and
loop theory; applications to the more common
psychological statistical problems will be stressed.
Wherry.

831  (815)  G 2
Seminars in Psychological Statistics
2 cl.
Prereq.: Permission of instructor.
a. Analysis of Variance.
   W. Briggs.
b. Experimental Design.
   Sp. Isaac.
c. Factor Analysis.
   A. Wherry.
d. Mathematical Models and Theory.
   W. Jones.
e. Non-Parametric Statistics.
   A. Wherry.
f.† Advanced Experimental Design.
   Sp.
g.† Advanced Multivariate Analysis.
   Sp.
h.† Computer Simulation Research.

834  G 3
Psychology of Infancy
A. 3 cl.
Prereq.: 837 or permission of instructor.
Not open to students with credit for 660.
Psychological development during the first four years
of life with particular reference to neonatal period and
research methodology in studies involving infants.
Wenar.

835  G 3
Child Development
A. 3 cl.
Prereq.: 837 or permission of instructor.
Major developmental aspects of childhood; review of
theory, methodology, research studies, and historical
and contemporary writing about children; consideration
of interdisciplinary approaches. Thompson.
836 G 3
Adolescent Development
Sp. 3 cl.
Prereq.: 837 or permission of instructor.
Major developmental aspects of adolescence; review of
theory, methodology, research studies, and historical
and contemporary writing about adolescents;
consideration of interdisciplinary approaches.
Horrocks.

837 (840) G 3
Nature and Direction of Human Development
A. 3 cl.
Critical consideration of human development, selected
theories and methods of investigation including units of
measurement; emergence of mind considered
through the phylogenetic and ontogenetic sequence.
Horrocks.

838 (854) G 2
Interaction of Developmental Learning Function
W. 2 cl.
Prereq.: 850 or 835 and 600 or 671 or equiv.
Relation of empirical data on imprinting, sensory and
motor deprivation, and environmental extensions upon
theoretical construction designed to integrate such
data. Thompson.

839 G 3
Comparative Child Rearing Practices
Sp. 3 cl.
Prereq.: 835 and 836 or equiv., and Sociol. 509 and
permission of instructor.
Comparative survey of familial and community
childrearing practices in modern and primitive
cultures; psychological and theoretical implications of
various practices; review of research methodology.
Helper.

840 (838) G 3-9
Practicum in Developmental Psychology
Prereq.: 2nd yr. grad. standing in Psychol. 837, 838 and
permission of instructor.
Repeatable to a maximum of 9 cr. hrs.
Observation of children in a representative variety of
clinical settings with particular reference to
developmental phenomena of growth and behavior;
application of research, diagnostic and intervention
methodology. Helper, Ruma, and Wenar.

841 G 1
Symposium in Developmental Literature
W. 1 cl.
Prereq.: Permission of instructor.
Critical review of current research literature in
developmental psychology. Horrocks.

842 (851) G 3
Seminar in Developmental Psychology
2 cl.
Prereq.: Permission of instructor.
   Su.
   Angelino.
b. Development of Dimensions of Cognitive
   Functions.
   Sp.
   Thomptson.
c. Development of Social Attitudes and Values.
   W.
   Rie.
d. Cultural Influences on Human Development.
   W.
   Clark.
e. Psychological Variables in Growth.
   W, Sp.
   Wenar.
f. Development of Creative Behavior.
   A.
   Clark.
g. Deviate Behavior in Childhood and Adolescence.
   A.
   Horrocks.
h. Phylogenesis.
i. Aging and Senescence.
j. Sequential Phenomena of Growth and
   Degeneration.
k. Developmental Aspects of Language.

843 G 3
Theories of Human Development
W. 3 cl.
Prereq.: 837.
Comparative presentation of significant major
historical and modern developmental theories with
specific evaluation of their relevance in the formulation
of a comprehensive psychological theory. Horrocks.

844 G 2
Psychopathology of Childhood
W. 2 cl.
Prereq.: 837 and permission of instructor.
A study of psychopathological conditions of childhood,
such as autism, schizophrenia, neurosis, acting out,
and behavior problems from a developmental point of
view. Wenar.

846 G 3
Advanced Educational Psychology
W. 3 cl.
Prereq.: Permission of instructor.
Critical consideration of research and theory in
developmental learning and measurement as relevant
to education; special attention to historical positions,
assumptions, and current literature. Clark.

847 (810) G 2
Psychological Problems in Higher Education
Sp. 2 cl.
Designed to give graduate students preparing for
college teaching positions contact with current
educational research regarding the psychological
problems they will encounter. Horrocks.
848  G 2  
Seminar in the College Teaching of Educational Psychology  
W, Sp.  2 cl.  
Prereq.: Permission of instructor.  
The objectives of educational psychology in teacher education; a presentation of practical problems in organization, development, and evaluation of undergraduate courses in educational psychology. Robinson.

849  (803)  G 2  
Seminar in Educational Psychology  
Sp.  2 cl.  
Prereq.: Permission of instructor. Libby.

853  G 3  
Psychology of the Exceptional Child and Adult  
Su.  3 cl.  
Review and evaluation of theoretical and research literature concerning exceptional children and adults. G. O. Johnson.

854  (824)  G 3  
Psychological and Child Study Services in the Public Schools  
Su, Sp.  3 cl.  
Prereq.: Permission of instructor.  
Professional problems in school psychology. Smith.

855  G 3  
Psycho-Educational Assessment and Consultation  
1 cl., 4 lab. hrs.  
Prereq.: Permission of instructor. .01 and .02 are prereq. for .03, .04, and .05.  
Theory and use of tests and other assessment techniques; practice in interviewing, writing psychological reports and consultation on the learning adjustment problems of children.

855.01 Assessment of Intelligence: Binet and Wechsler Scales  
Su, A. Smith.

855.02 Assessment of Personality and Behavioral Disorders in Children  
Su, W. Bersoff and Smith.

855.03 Assessment of Sensory, Motor, and Language Impairment in Children  

855.04 Developmental Assessment of Behavior  

855.05 Advanced Practicum in Psychological Assessment and Consultation  
A. Bersoff.

856  G 1-3  
Seminar in School Psychology  
Prereq.: Permission of instructor.  
Two sections (a and b) are given and may be taken concurr. Smith.

857  G 4  
Psychological Problems in Mental Retardation  
A.  4 cl.  
Prereq.: 570 and permission of instructor.  
Advanced study of psychological aspects of mental retardation; topics include theories of mental retardation, studies of sensory and perceptual processes, cognitive chronically ill and neurologically impaired. G. O. Johnson.

858  G 4  
Psychological Problems in Physical Disability  
Sp.  4 cl.  
Prereq.: 570 and permission of instructor.  
Advanced study of cognitive and non-cognitive functioning in those with motor and sensory disabilities, and the chronically ill and neurologically impaired.

859  G 2  
Seminars in the Psychology of Exceptional Children and Adults  
Sp.  2 cl.  
Prereq.: Permission of instructor.  
Repeatable to a maximum of 6 cr. hrs. Advanced topics in research strategies and methodology; specialized topics on the growing edge of the psychology of exceptional children and adults. Angeline.

860  (818)  G 3  
Theories of Personality  
A.  3 cl.  
Prereq.: Advanced work in personality and social Psychol. and permission of instructor.  
A critical consideration of the theories of personality structure and origin. Mirels.

861  G 3  
Clinical Psychology  
Prereq.: Permission of instructor.  
Introduction to the theory and use of clinical methods in psychology including interviewing, observation of free behavior, case documentation, professional problems, and individual testing; designed for first-year graduate students. Kangas and Kaswar.

861.01 Lecture  G 3  
A.  3 cl.

861.02 Practicum G 2  
A.  4 lab. hrs.

862  G 1-3  
Psychopathology  

862.01 Lecture  G 3  
W.  3 cl.

862.02 Practicum G 2  
W.  4 lab. hrs.
Psychodynamics
Prereq.: Permission of instructor.
Survey of personality theories, particularly those related to methods of psychological treatment; laboratory involves cases in children's clinics, mental hospital or school system. Kaswan.
863.01 Lecture G 3
Sp. 3 cr.
863.02 Practicum G 2
Sp. 4 lab. hrs.

Psychodiagnostic
Prereq.: Permission of instructor.
Theory and use of psychodiagnostic tests; laboratory includes administration, scoring, and interpretation of projective tests. Weaver.
864.01 Lecture G 3
Sp. 3 cr.
864.02 Practicum G 2
Sp. 4 lab. hrs.

The Psychology of Group Therapy
A. 2 cl.
Prereq.: 662 or permission of instructor.
Primarily for students who may use psychological group methods in professional work; general principles of group therapy and specific methods with children and adults described and evaluated. Cortis.

Advanced Psychological Clinic
Prereq.: Permission of instructor.
Theory and practice of psychotherapy; offered in connection with community services of Psychology Clinic. Two practicums: Type A, advisory services, and Type B, treatment services. Kaswan, Weaver, and Siegel.
865.01 Lecture G 2
W. 2 cl.
865.02 Practicum G 3
A, W, Sp. 6 lab. hrs.
Repeatable to a maximum of 9 cr. hrs., with no more than 6 hrs. of one type.

Seminar in Clinical Abnormal Psychology
A, W, Sp. 2 cl.
Prereq.: Permission of instructor.
Two sections may be offered in any one qtr.

Community Psychology
A, W, Sp. 2 cl., 6 lab. hrs.
Prereq.: 2nd yr. of grad. study; permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Given as a year sequence. No new students will normally be admitted for the Winter and Spring quarters.
Integrate ecological, social, and interpersonal variables in the analysis and change of behavior; participant observation and research in community settings. Kaswan.

Advanced Social Psychology
A. 3 cl.
Prereq.: 26 cr. hrs. in Psychol. including 320 and 802 or 600 or equiv.
Problems of learning and perception relative to the social environment, the influence of culture in the development of individual behavior patterns, and related topics. Brock.

Counseling and Therapy as Social Institutions
A. 3 cl.
A review of diverse counseling and therapeutic practice as belief and ritual, with emphasis upon their manifest and latent functions in American society. Pepinsky.

Social Psychology Laboratory
A, W, Sp. 2 cl., 2 lab. hrs. for each additional cr. hr.
Prereq.: Permission of instructor.
Repeatable to a maximum of 12 cr. hrs.
Advanced training in methods and data collection in the areas of social psychology, laboratory, and field experience. Brock, Greenwald, Lalane, and Ostrom.

Seminar in Social Psychology
3 cl.
Prereq.: Permission of instructor.
a. Contemporary Attitude Theory and Research.
Sp. Greenwald.
b. Social Structure and Personality.
Sp. Ostrom.
W. Brock.
d. The Psychology of Social Movements.
W.
e. Current Research Trends.
Sp. Greenwald.
f. Group Processes.
W. Lalane.

Cognitive Processes
A. 3 cl.
Prereq.: 20 cr. hrs. in Psychol. or permission of instructor.
Theories of complex information processing functions and their acquisition; special attention to the role of language in complex perceptual and motor performances. Greenwald.
875  G 4
Practicum in Social Psychology
A, W, Sp. 2 cl., 9 lab. hrs.
Prereq.: Grad. standing in Psych. or permission of instructor.
Survey and supervised experience in using the technique and research designs of social psychology. Brock.
875.01 Practicum in Social Psychology I
A.
875.02 Practicum in Social Psychology II
W.
875.03 Practicum in Social Psychology III
Sp.

880  (782)  G 3
Laboratory in Student Services and Organizations
W, Sp. 2 cl., 6 lab. hrs.
Prereq.: Permission of instructor.
Supervised experience in admissions, international students, financial aid, student organizations, housing, college offices, etc.; weekly seminar. Stewart.

881  (827)  G 2
Administrative Aspects of Student Personnel Work
Su, W. 2 cl.
Prereq.: Permission of instructor.
Advanced graduate students have the opportunity of relating principles and concepts of student personnel administration to operating procedures on the campus. MacMinn and Stewart.

882  (821)  G 3
Psychology of Counseling
Su, A, Sp. 3 cl.
Prereq.: 13 cr. hrs. in Psychol.
Assumptions and facts fundamental to counseling; factors in the interview situation; nature of counseling techniques; resources in counseling; relation of counseling to other personnel procedures. Osipow, Robinson, and Schmidt.

883  (852)  G 3
Counseling Diagnostics
Prereq.: 510 or equiv., 511 or equiv., and (for lab.) permission of instructor.
Theory and application of interview data, observed behavior, test results, and biographical information as a basis for diagnostics in counseling and evaluation. Fletcher.
883.01 Lecture  G 3
W. 3 cl.
883.02 Practicum G 2
W. 4 lab. hrs.

884  (823)  G 3
Psychology of Career Development
Sp. 2 cl.
A survey and critical analysis of literature and research regarding effects of sequence of work activity, vocational exploration, and career development. Osipow.

885  (832)  G 3
Beginning Practicum in Counseling
Prereq.: 883 and permission of instructor.
Repeatable to a maximum of 6 cr. hrs.
Supervised practice in assisting college students in their adjustment to college; emphasis on diagnosis and treatment; special help given to interviewing procedures. Stewart and Osipow.

886  (833)  G 2-3
Advanced Practicum in Counseling
A, W, Sp. 1 cl., 2 lab. hrs. for each hr. of additional cr.
Prereq.: 885 and permission of instructor.
Repeatable to a maximum of 9 cr. hrs.
Supervised practice in (a) assisting college students and adults with problems of personality adjustment or (b) supervising techniques through observation and discussion of work with other counselors. Fletcher, Osipow, and Walsh.

887  (822)  G 2
Seminar in Counseling Psychology
Prereq.: Permission of instructor.
Campbell, Osipow, and Walsh.

888  (674)  G 3
Psychological Study of Individuals and Groups
W. 3 cl.
Prereq.: Permission of instructor.
Not open to students with 6 cr. hrs. in 650.
Basic concepts and techniques of student personnel work.

889  G 1-5
Interdepartmental Seminar
Sp.
(See under Interdepartmental Seminars.)

890  (880)  G 1-15
Supervised Field Experience in Psychology
Prereq.: Psychol. 2nd yr. standing and approval of local staff of area in which student is specializing. (Supervised by member of local staff and some member of the outside agency approved by the Dept. of Psychol.) Repeatable to a maximum of 30 cr. hrs.
Supervised experience, either research or operational, in any agency doing professional psychological work such as a school system, a psychological clinic, an industrial personnel department, or a counseling center.

999  (950)  G Arr.
Research in Psychology
Research for thesis or dissertation purposes only.
Public Administration

Office: 302 Mayerly Hall, 1775 South College Road

Professors Oster, (Director), Brady, Carroll, Lundstedt, Lynn, and Stocker; Assistant Professor Stilingsby.

800  G 3
Research Methods in Public Administration
Sp. 1 3-hr. cl.
Methods of research in public administration including
the design of thesis and dissertation proposals.

801  G 3
Introduction to Public Administration
A. 1 3-hr. cl.
Critical analysis of the environmental constraints upon
the problem-solving role of the administrator in the
public sector environment; examination of structure,
processes, and problems.

802  G 3
Legal Environment of Public Administration
W. 1 3-hr. cl.
An examination and analysis of the constraints
imposed upon public administrative processes by the
legal environment including judicial policy-making and
the evolving legal order.

803  G 3
Seminar on Public Policy Formulation
Sp. 1 3-hr. cl.
Prereq.: 801 and 802.
Study of the policy formulation process in a political
setting emphasizing the management or resolution of
conflict within a public bureaucracy; selected cases.

804  G 3
Seminar on Governmental Information
Systems Administration
A. 2 3½-hr. cl.
Prereq.: Acc. 712 or equiv. or permission of instructor.
Critical study of the administration and design of
management information systems for public agencies;
selected case studies.

805  G 3
Seminar on Systems Analysis
for Public Policy Decisions
W. 2 3½-hr. cl.
Prereq.: 801, 802, 803, 804, Econ. 501, and Bus. Admin.
801U2 or permission of instructor.
Studies in the application of systems analysis to
administrative and policy problems in the public
sector; selected case studies and problems.

806  G 3
Seminar on Planning and Program Budgeting
Sp. 2 3½-hr. cl.
Prereq.: 804 or equiv. and Econ. 501 or equiv. or
permission of instructor.
Critical analysis of the administration and design of a
planning, programming, and budgeting system;
examination of case studies emphasizing applied and
theoretical problems.

850  G 3
Policy Problem Seminar I
W.
Prereq.: Permission of instructor.
Multidisciplinary seminar integrated with field
experience in the solution of actual public
administrative and policy problems, organized around
problem areas.

851  G 3
Policy Problem Seminar II
Sp.
Prereq.: 850.
Continuation of 850.

860  G. Arr.
Seminar on Advanced Problems
in Public Administration
Prereq.: Permission of instructor.
Repeatable to a maximum of 6 cr. hrs. in any one
subdivision.
Special studies of selected problems which may
include readings, case studies, internships, field
investigations, simulation, systems analysis, role
playing, team teaching, and other experimental
techniques.

860.01 Comparative Administration
860.02 Correctional Administration
860.03 Defense Policy Administration
860.04 Development Administration
860.05 Fiscal Administration
860.06 Health Services Administration
860.07 Information Systems Administration
860.08 Municipal Administration
860.09 Natural Resources Administration
860.10 Personnel and Labor Relations Administration
860.11 Planning Administration
860.12 Research Administration
860.13 Urban Affairs Administration
860.14 Welfare Administration
860.99 Special

998  G Arr.
Research in Public Administration: Thesis
Repeatable to a maximum of 6 cr. hrs.
Research for thesis purposes only.

999  G Arr.
Research in Public Administration: Dissertation
Repeatable to a maximum of 45 cr. hrs.
Research for dissertation purposes only.
Radiology

Office: N-208 University Hospital, 410 West Tenth Avenue

Professors Nelson (Chairman), Batten, Christoforidis, Freimanis, Malnar, and Myers; Associate Professors Dunbar, Graves, Riccobono, Soppp; Assistant Professors Goldstein, Kartha, Stockum, and Weber.

The Comprehensive Evaluation of the Patient
(See Med. 601, 602, and 603.)
[Discussions of radiological methods contributing to the diagnosis and therapy of various abnormal physiological and pathological entities presented.]

740 P 6, 12, 18
Clinical Radiology
1, 2, 3, or 4 months; offered all months except June, July, Aug.
Prereq.: Med. 3rd or 4th yr. standing.
Repeatable to a maximum of 24 cr. hrs.
Participation in special seminars and clinics; optional research project.
  a. Radiologic diagnosis.
  b. Radiation therapy.

750 P 1
Advanced Radiology
1 month, offered Oct. and Feb.
Prereq.: Med. 4th yr. standing.
Clinical clerkship in the Department of Radiology, University Hospital; instruction in radiation therapy and film reading techniques.

793 P 6, 12, 18
Individual Studies
1, 2, 3, or 4 months; offered all months except June, July, and Aug.
Prereq.: Med. 3rd or 4th yr. standing.
Repeatable to a maximum of 24 cr. hrs.
Graduated participation in diagnostic and therapeutic radiology; optional research project after 6 credit hours in 793.

799 P 18
Residency in Radiology
12 months full time, beginning any month.
Prereq.: Appointment as Resident, University Hospital.
Repeatable to a maximum of 216 cr. hrs.
General diagnostic radiology, nuclear medicine, and radiation therapy, special diagnostic and therapeutic procedures, consultations, and conferences.

999 (950) G Arr.
Research in Radiology
Research for thesis purposes only.

Romance Linguistics

Office: 248 Dieter Cunz Hall of Languages, 1841 Millikin Road

Professors Bulskin (Chairman) and Griffin.

811 (847) G 5
Romance Linguistics I
A. 5 cr.
Prereq.: Permission of instructor.
Not open to students with credit for (847).
A general survey of the development of the Romance languages and an introduction to the basic materials and techniques of investigation. Griffin.

812 (848) G 5
Romance Linguistics II
W. 5 cr.
Prereq.: 811 or permission of instructor.
Not open to students with credit for (848).
Topics and problems, both synchronic and diachronic; special attention to the minor Romance languages. Griffin.

831† (822) G 3-5
Seminar in Romance Linguistics
A, Sp.
Prereq.: Permission of instructor.
Griffin.

993 G 1-5
Individual Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.

994 G 1-15
Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 30 cr. hrs.
Investigation of minor problems in the various fields of Romance Linguistics.
Rural Sociology

Office: 104 Agricultural Administration Building, 2120 Yates Road

Professors Boyne (Chairman), McCormick (Associate Chairman), Bailey, R. H., Baker, R. L., Baker, Barr, Baumer, Cravens, Dugan, Ezzell, Hadley, Jacobson, Jones, Miller, Mitchell, Ocker, Sharp, Shaudys, Sherman, Sitterley, Smith, Stout, Walker, Wayt, and Williams; Associate Professors Adams, Bottoum, Darrow, Hines, Ingram, Marion, McDonald, Moore, Phillips, Rask, Steele, and Wessell; Assistant Professors Bowen, Erven, Hahn, Hixson, Lee, Simonds, Thomas, Tongate, and Vandemark; Instructors Pierce, Pugh, Tucker, and Watkins.

105 (405) U 5
Introduction to Rural Sociology
A, W, Sp. 5 cr.
Not open to students with credit for Soc. 101 or 201.
Principles of society, major social institutions and social change; emphasizes social changes in rural life, rural organizations, population, and family living. Phillips and Mitchell.

GENERAL PREREQUISITES FOR COURSES NUMBERED 300 AND 400
Unless otherwise indicated, the prerequisites for 300 and 400-level courses are 90 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed., or specified course(s) numbered 300-399.

320 (530) U 5
The Rural Family
A. 5 cr.
Prereq.: 105, Soc. 101, or 201.
Not open to students with credit for 310.
Structure and functions of rural families in changing societies.

342 (506) U 3
Rural Leadership
Su, Sp. 1.2 hr. cl., 1.2 hr. lab.
Prereq.: 105, Soc. 101, or 201.
Not open to students with credit for 317.
Basic principles and practices in the development of effective leadership in organization and community action programs; power structures and levels of leadership are examined. Mitchell.

GENERAL PREREQUISITES FOR COURSES NUMBERED 500
Unless otherwise indicated, the prerequisites for 500-level courses are 15 cr. hrs. in courses in the same discipline numbered 200 or higher, or 10 cr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 200 or higher in specified allied disciplines; or baccalaureate degree.

542 (609) U 5
Rural Social Organization
A. 4 cr., 1.2 hr. lab.
Not open to students with credit for 316.
Elements of social organization, functions of formal and informal social systems, process of making decisions in communities; analysis of actual rural community.

562 (640) U G 3
Diffusion of Information on Agricultural Technology
Sp. 3 cr.
Not open to students with credit for 421.
The process by which new ideas diffuse to the farmer and homemaker; emphasis on the role of group influences, professional agricultural workers, and adoption leaders.

593 (701) U G 2-5
Individual Studies
H393 (honors) may be available to students enrolled in a college honors program or eligible for enrollment.
Prereq.: Permission of instructor.

GENERAL PREREQUISITES FOR COURSES NUMBERED 600
Unless otherwise indicated, the prerequisites for 600-level courses are 15 cr. hrs. in courses in the same discipline numbered 300 or higher, or 10 cr. hrs. in courses numbered 300 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 300 or higher in specified allied disciplines.

642 (606) U G 5
Advanced Rural Sociology
W. 5 cr.
Prereq.: 15 cr. hrs. in Rur. Soc. and/or Soc. at the 300 level or higher.
Not open to students with credit for 600.
An advanced course on rural society dealing with fundamentals in rural social institutions and organizations, rural social change and nature of rural social systems.

662 (660) U G 3
Rural Sociology of Developing Societies
W. 3 cr.
Prereq.: 105, Soc. 101, or 201.
Not open to students with credit for 422.
Sociological principles applied to analysis of present social systems and institutions of developing nations for students preparing for foreign service with rural societies. Phillips.

693 (701) U G 2-5
Individual Studies
H693 (honors) may be available to students enrolled in a college honors program or eligible for enrollment.
Prereq.: Permission of instructor.

694 U G 2-4
Group Studies
An intensive study of a selected area in rural sociology appropriate to the needs of the group not provided in other courses.

GENERAL PREREQUISITES FOR COURSES NUMBERED 800 AND 900
Unless otherwise indicated, the prerequisites for 800 and 900-level courses are 30 cr. hrs. in courses in the same discipline, or 20 cr. hrs. in the same discipline, plus 25 cr. hrs. in specified allied disciplines.
Seminars in Rural Sociology
Prereq.: 30 cr. hrs. in Rur. Soc. and/or Soc.
Each decimal subdivision repeatable to a maximum of 8 cr. hrs.

996.01 Population Problems

996.02 Rural Family

996.03 Rural Health

996.04 Rural Leadership

996.05 Rural Community and Institutions

996.06 Community Development

996.07 Diffusion of Technology

996.08 Research Methods in Rural Sociology

996.09 Social Organization and Administrative Problems

996.10 Sociology of Foreign Areas

996.11 Rural Church

996.12 Farmer Organizations

999 (950) G Arr.
Research
Research for thesis and dissertation purposes only.

103 (403) U 5
Intermediate Russian
Su, A, W, Sp. 5 cl.
Prereq.: 102.
Reading of prose and poetry; oral and written practice; grammar review.

104 (404) U 5
Intermediate Russian
Su, A, W, Sp. 5 cl.
Prereq.: 103 or 112.
107, 108, and 109 may be taken in lieu of 104.
Reading of prose and poetry; oral and written practice; vocabulary building.

107 (407) U 2
Scientific Russian Reading
A. 2 cl.
Prereq.: 103 or 112.
107, 108, and 109 may be taken in lieu of 104.
Concentration on material of general interest to all sciences.

108 (408) U 2
Scientific Russian Reading
W. 2 cl.
Prereq.: 107 or permission of instructor.
107, 108, and 109 may be taken in lieu of 104.
Reading of unedited texts from current Soviet publications.

109 (409) U 2
Scientific Russian Reading
Sp. 2 cl.
Prereq.: 108 or permission of instructor.
107, 108, and 109 may be taken in lieu of 104.
Specialized reading and translation of a major contribution in one of the sciences.

112 (415) U 5, 10, 15
Intensive Russian
Su, A. 15 cl.
Full time of student and full fees required.
Prereq.: Permission of chairman.
Students with credit for 101 or the equiv. may not register for more than 10 cr. hrs. Students with credit for 101 and 102 or the equiv. may not register for more than 5 cr. hrs. Students with credit for 103 or the equiv. may not register for credit.
Registration limited. Early enrollment advised.
Elementary and intermediate Russian for students desiring comprehensive knowledge of Russian in the shortest possible time.

162 (430) U 5
Elementary-Intermediate Russian for Selected Students
W. 5 cl.
Prereq.: Grade of A in 101.
Not open to students with credit for 130.
Kresky.
163 (431) U 5
Elementary-Intermediate Russian for Selected Students
Sp. 5 cl.
Prereq.: 161.
Not open to students with credit for 131.
Successful completion of the sequence 101-162-163 fulfills language requirements and provides eligibility for 400-level courses.

405 (505) U 3
Russian Conversation
A, W, Sp. 3 cl.
Prereq.: 104 or permission of instructor.
Drill in everyday patterns of conversation.

406 (506) U 2
Russian Composition
A, W, Sp. 2 cl.
Prereq.: 104 or permission of instructor.
Practice in simple writing.

407 (507) U 3
Intermediate Conversation
A, W, Sp. 3 cl.
Prereq.: 405 or permission of instructor.
Drills in intonation; perfection of pronunciation; oral reports; expansion of spoken vocabulary.

408 (508) U 2
Review Grammar and Composition
A, W, Sp. 2 cl.
Prereq.: 406 or permission of instructor.
Review of Russian grammar, composition on assigned topics, practice in translation.

412 (516) U 5 or 10
Intermediate Intensive Russian
Su, W. 10 cl.
Prereq.: 103, 112, or permission of chairman.
The equiv. of 104, 405, and 406. Students with credit for 104 may, with permission of chairman, register for 5 cr. hrs. instead of 10 cr. hrs. The course must be taken in its entirety.

420 (520) U 5
Russian Literature in English Translation: From Pushkin to Turgenev
A. 4 cl.
Not open to students with credit for (411) or (620).
An introduction to the Russian novel, drama, and poetry; major contributions of Pushkin, Lermontov, Gogol, Ostrovsky, Goncharov, and Turgenev.

421 (521) U 5
Russian Literature in English Translation: From Dostoevsky to Blok
W. 4 cl.
Not open to students with credit for (614) or (620).
Reading and analysis of Crime and Punishment, War and Peace, The Golovlyov Family, as well as short stories and plays by Chekhov, Gorky, Bunin, Bely, and Andreyev.

475 (575) U 3
Introduction to Russian Literature, The Early Classics: Romanticism, The Natural School, and Early Realism
Su, A. 3 cl.
Prereq.: 405, 406, or permission of instructor.
Conducted in Russian.
Readings from representative authors such as Pushkin, Lermontov, Gogol, and Turgenev. Kresky.

476 (576) U 3
Introduction to Russian Literature, The Russian Realists
Su, W. 3 cl.
Prereq.: 405, 406, or permission of instructor.
Conducted in Russian.
Readings from representative authors such as Turgenev, Dostoevsky, Tolstoy, and Goncharov. Kresky.

477 (577) U 3
Introduction to Russian Literature, Impressionism, Critical Realism, Symbolism, and Socialist Realism
Su, Sp. 3 cl.
Prereq.: 405, 406, or permission of instructor.
Conducted in Russian.
Readings from representative authors such as Chekhov, Gorky, Bunin, Blok, and Sholokhov. Kresky.

513 U G 5
Translation Techniques I
A. 5 cl.
Prereq.: Minimum of 25 cr. hrs. of Russ. or equiv.
Translation of material from the social sciences; discussion of techniques, procedures, methodology, and the art of translation.

514 U G 5
Translation Techniques II
W. 5 cl.
Prereq.: 513 or equiv. or permission of instructor.
Continuation of 513; work with progressively more difficult passages.

522 U G 5
Russian Literature in English Translation: Soviet Literature
Su, Sp. 4 cl.
Prereq.: 420, 421, or permission of instructor.
Not open to students with credit for (516) or 622.
A survey of Soviet Russian literature from 1917 to the present; reading of representative authors such as Fadeyev, Leonov, Fedin, Sholokhov, and Pasternak. Oulanoff.

571 (690) G 5
Basic Russian for Graduate Students
Su (1st term), A, W. 5 cl.
Prereq.: Grad. standing.
Credit does not apply to the minimum hours required for the master's or doctoral degrees.
Basic elements of Russian grammar.
572 (691) G 5
Russian for Research
Prereq.: Grade of C or above in 571 or equiv.
Credit does not apply to the minimum hours required for the master’s or doctoral degrees.
Repeatable twice.
Satisfactory completion of this course (grade A or B) will be accepted as evidence of a dictionary reading knowledge in fulfillment of Ph.D. language requirement.

608 U G 5
Review of Grammar
A. 4 cl.
Concur.: 533.
Open only to students in the Certificate Program.
Review of grammar with emphasis on those elements of special value to translators of factual material.

609 U G 4
Advanced Reading, Conversation, and Composition I
Su, A. 3 cl., 2 hr. arr.
Prereq.: 10 cr. hrs. of 400-level courses in Russ., including 405, 406, or permission of instructor.
Reading of contemporary prose and verse, presentation of oral and written reports, drill in intonation patterns, translation from English into Russian.

610 U G 4
Advanced Reading, Conversation, and Composition II
Su, W. 3 cl., 2 hr. arr.
Prereq.: 609 or permission of instructor.

611 U G 4
Advanced Reading, Conversation, and Composition III
Su, Sp. 3 cl., 2 hr. arr.
Prereq.: 610 or permission of instructor.

612 (517) U G 15
Study Tour of the USSR
Sp.
Prereq.: Minimum of 25 hrs. of Russ. or equiv. and permission of dept. chairman.
At The Ohio State University students will be given advanced work in conversation and reading in order to prepare for the tour; in the USSR only Russian will be spoken; some formal instruction will be given daily by the tour leaders.

615 U G 5
Translation Techniques III
Sp. 5 cl.
Prereq.: 514 or equiv. or permission of instructor.
Translation of modern fiction; comparative and contrastive analysis of problems encountered in translating fiction and factual material.

630 U G 5
Applied Linguistics for the Russian Major
A. 3 cl.
Prereq.: 405 and 406.
Introduction to the categories and techniques of applied linguistics, especially phonemic and morphemic analysis; all examples drawn from Russian and English.

635 U G 5
Practical Russian Pronunciation
W. 3 cl., 2 hrs.
Prereq.: 405 and 406.
Lectures and practical exercises; use of phonetic symbols; corrective exercises; problems of teaching pronunciation.

640 U G 5
Contrastive Structures of Russian and English
Su, Sp. 3 cl.
Prereq.: 405 and 406.
Comparison of the structures of the Russian and English languages stressing practical difficulties in pronunciation and grammar.

GENERAL PREREQUISITES FOR 600 LEVEL COURSES IN LITERATURE
Nine credit hours in Russian Literature courses 400 level or above.

645* U G 5
Survey of Russian Poetry
W. 3 cl.
Prereq.: 475, 476, and 477.
Development of poetry from the 18th century to the present; readings from major periods and movements.

650* U G 5
Dostoevsky
A. 3 cl.
Prereq.: 9 cr. hrs. in literature courses at the 400 level or above.
Given in English but undergraduate majors in Slavic will do prescribed portions of the reading in the original; grad. students in Slavic must read in the original items starred on the departmental M.A. Reading List.
Critical analysis of the major novels and shorter works; intellectual and literary development of Dostoevsky.

651* U G 5
Tolstoy
W. 3 cl.
Prereq.: 9 cr. hrs. in literature courses at the 400 level or above.
Given in English but undergraduate majors in Slavic will do prescribed portions of the reading in the original; grad. students in Slavic must read in the original items starred on the departmental M.A. Reading List.
Analysis of all major works including the novels, plays, stories, and important polemical works.

652* U G 5
Turgenev and Chekhov
Su, Sp. 3 cl.
Prereq.: 9 cr. hrs. in literature courses at the 400 level or above.
Given in English but undergraduate majors in Slavic will do prescribed portions of the reading in the original; grad. students in Slavic must read in the original items starred on the departmental M.A. Reading List.
Critical analysis of the major novels, plays, and short stories of both writers; stylistic similarities and differences.
653†  U G 5
Russian Drama
A.  3 cl.
Prereq.: 9 cr. hrs. in literature courses at the 400 level or above.
Given in English but undergraduate majors in Slavic will do prescribed portions of the reading in the original; grad. students in Slavic must read in the original items starred on the departmental M.A. Reading List.
Emphasis on the period from 1850 to present day; Ostrovsky, Chekhov, Gorky, Andreyev, Blok, and Soviet writers Leonov and Kataev.

654†  U G 5
Gogol
W.  3 cl.
Prereq.: 9 cr. hrs. in literature courses at the 400 level or above.
Given in English but undergraduate majors in Slavic will do prescribed portions of the reading in the original; grad. students in Slavic must read in the original items starred on the departmental M.A. Reading List.
Critical analysis of all major works including novels, plays, short stories, and important polemical works.

655†  U G 5
Writers of Satire and Byt
Sp.  3 cl.
Prereq.: 9 cr. hrs. in literature courses at the 400 level or above.
Given in English but undergraduate majors in Slavic will do prescribed portions of the reading in the original; grad. students in Slavic must read in the original items starred on the departmental M.A. Reading List.
Critical analysis of the major works of Aksakov, Goncharov, Saltykov-Shchedrin, and Leskov.

693  U G 2-10
Individual Studies in Russian
Prereq.: Permission of dept. chairman.
Repeatable to a maximum of 15 cr. hrs.
693.01 Literature to 1820
693.02 Literature 1820-1817
693.03 Literature since 1817
693.04 Morphology
693.05 Phonology
693.06 Dialectology
693.07 Old Russian
693.08 Unspecified

801  G 3
College Teaching of Russian I
A.  3 cl., 2 lab. hrs.
Prereq.: 611 or equiv., or permission of instructor.
Methods and techniques for teaching Russian at the College level; selection and preparation of teaching and testing materials; the language laboratory and other aids.

802  G 2
College Teaching of Russian II
W.  2 cl., 1 lab. hr.
Prereq.: 631 or permission of instructor.
Continuation of 801; development of advanced instructional and testing materials; selection of readings and cultural materials; planning undergraduate Russian language programs; research on language teaching.

810  G 5
Old Church Slavonic
Su.  5 cl.
Study of the earliest recorded Slavic language; reading and linguistic interpretation of original documents.

812*  G 5
Readings in Old Church Slavonic Texts
W.  3 cl.
Prereq.: 810 or permission of instructor.
Reading and analysis of Church Slavonic texts of the later period.

813*  G 5
Readings in Old Russian
Sp.  3 cl.
Prereq.: 810 or permission of instructor.
Reading and analysis of Old Russian texts.

820  G 3
History of the Russian Language
Su.  3 cl.
A survey of phonetic, morphological, and syntactical changes from the period of Common Slavic to the present; the formation of the Russian literary language.

823†  G 5
Development of the Russian Literary Language
A.  3 cl.
Prereq.: 820 or permission of instructor.
The formation of Russian as a literary language; the role of Church Slavonic elements in its formation and Western influences on Russian.

826*  G 5
Structure of Russian: Morphology
Su.  3 cl.
Prereq.: 640 or permission of instructor.
Analysis and description of the morphological system of contemporary standard Russian.

827†  G 5
History of Russian: Morphology
Sp.  3 cl.
Prereq.: 620 or permission of instructor.
Development of Russian morphology from Common Slavic to contemporary Russian with consideration of the place of Russian within East Slavic.

828*  G 5
Structure of Russian: Phonology
W.  3 cl.
Prereq.: 640 or permission of instructor.
Description and analysis of the phonological system of contemporary standard Russian.
829*  G  5
History of Russian: Phonology
Sp.  3 cl.
Prereq.: 822 or permission of instructor.
Development of Russian phonology from Common
Slavic to contemporary standard Russian with
consideration of the place of Russian within East
Slavic.

830* (760)  G  5
Russian Literature to 1850
Su.  3 cl.
Emphasis on literature of the Kievan period. Silbajorís.

831* (761)  G  5
Russian Literature 1650-1800
Su.  3 cl.
The baroque period, classicism, and sentimentalism;
emphasis on the classical period of the 18th century.
Silbajorís.

832*  G  5
History of Russian Literary Criticism I
A.  3 cl.
Prereq.: 2nd yr. grad. standing or permission of
instructor.
From the 17th century to 1800; reading and discussion
of Prokopenko, Trediakovsky, Sumarokov, Karamzin,
Belinsky, Chernyshhevsky, Pisarev, Dobroliubov,
Mikhailovsky, Grigor'ev, and Leon'tev.

833*  G  5
History of Russian Literary Criticism II
Su.  3 cl.
Prereq.: 2nd yr. grad. standing or permission of
instructor.
From 1850 to the present; decadents, modernists, and
symbolists to 1930; Leo Tolstoy; formalism and the
sociological method in the 1920's; socialist realism.

834*  G  5
Russian Folklore
Su.  3 cl.
Prereq.: 2nd yr. grad. standing or permission of
instructor.
From the beginning to present; proverbs, the oral epic,
historical songs, folktales, the folk theatre; analysis of
the folklore component in modern Russian literature.

840†* (670)  G  5
Pushkin and His Time
W.  3 cl.
Analysis of Eugene Onegin as poetry and an
encyclopedia of the times; social, political, and cultural
trends in the 1820's and 1830's; romantic Poets.
Silbajorís.

841*  G  5
Russian Poetry to 1890
W.  3 cl.
Readings from the major poets of the 18th and 19th
centuries: Lomonosov, Zhukovsky, Pushkin, Lermontov,
Tiutchev, Fet, Nekrasov, Polonosy, and others.

842*  G  5
Russian Poetry from 1890 to Present
Sp.  3 cl.
Major movements and poets: Blok, Bely, Bриусов,
Baimont, Myakovskiy, Gumilyov, Akhmsleva, Eisenin,
Pasternak, Tvardovsky, Evlashenko, and others.

843†*  G  5
Russian Poetics and Versification
Sp.  3 cl.
Prereq.: 645, 841, 842, or permission of instructor.
Development of Russian versification from the bylina to
the present; folk meter, syllabic verse, syllabo-tonic
versification of the 19th and 20th centuries, tonic verse.

850†  G  5
Seminar in Russian Literature to 1820
W.  2 cl.

851  G  5
Seminar in Russian Literature 1820-1917
A, Sp.  2 cl.

852 (850)  G  5
Seminar in Soviet Literature
Su, W.  2 cl.

993  G  2-10
Individual Studies
Prereq.: Permission of dept. chairman.
Repeatable to a maximum of 30 cr. hrs. in any
combination of decimal subdivisions.

993.01  Literature to 1820
993.02  Literature 1820-1917
993.03  Literature since 1917
993.04  Morphology
993.05  Phonology
993.06  Dialectology
993.07  Old Russian
993.08  Unspecified

994  G  2-10
Group Studies in Russian
Prereq.: Permission of dept. chairman.
Repeatable to a maximum of 15 cr. hrs.

Serbo-Croatian

Office: 204 Dieter Cunz Hall of Languages, 1841 Millikin Road
Associate Professor Naylor; Assistant Professors
Kragholt and Matejic.

601†  U  G  4
Serbo-Croatian
A.  3 cl., 2 hr. arr.
Prereq.: Russ. 103 or 112 or permission of instructor.
602\* U G 4
Serbo-Croatian
W. 3 cl., 2 hr. arr.
Prereq.: 601 or permission of instructor.

603\* U G 4
Serbo-Croatian
Sp. 3 cl., 2 hr. arr.
Prereq.: 602 or permission of instructor.

604* U G 3
Intermediate Serbo-Croatian
Su, A. 3 cl.
Prereq.: 603 or equiv.
Reading of simple Serbo-Croatian texts from the 19th century.

605* U G 3
Intermediate Serbo-Croatian
Su, W. 3 cl.
Prereq.: 604 or permission of instructor.
Reading texts of moderate difficulty, conversation, and simple compositions.

606* U G 3
Intermediate Serbo-Croatian
Su, Sp. 3 cl.
Prereq.: 605 or permission of instructor.
Reading from modern Serbo-Croatian literature, practice in writing and speaking.

612* U G 15
Study Tour of Yugoslavia
Sp.
Prereq.: 605 or equiv. and permission of dept. chairman.
Students will receive advanced work in conversation and reading in preparation for the tour; in Yugoslavia, only Serbo-Croatian will be spoken; daily instruction by tour leaders.

620* U G 5
Serbo-Croatian Literature in English Translation
A. 3 cl.
Prereq.: 4th yr. standing or grad. standing or permission of instructor.
Grad. students in Slavic may be required to do some reading in Russ. and French or Ger.
From the medieval period to the beginning of the 19th century; religious literature, heroic songs, written epic, the Renaissance, and classicism.

621* U G 5
Serbo-Croatian Literature in English Translation
W. 3 cl.
Prereq.: 4th yr. standing or grad. standing or permission of instructor.
Grad. students in Slavic may be required to do some reading in Russ. and French or Ger.
Literature of the 19th and 20th centuries; emphasis on Vuk Karadzic, Njesos, and Andric.

693 U G 2-10
Individual Studies in Serbo-Croatian
Prereq.: Permission of chairman.
Repeatable to a maximum of 20 cr. hrs.
693.01 Literature to 1850
693.02 Literature, 1850-1918
693.03 Literature since 1918
693.04 Morphology
693.05 Phonology
693.06 Dialectology
693.07 Old Serbian
693.08 Unspecified

694 U G 2-10
Group Studies in Serbo-Croatian
Prereq.: Permission of chairman.
Repeatable to a maximum of 15 cr. hrs.

722* U G 5
Contemporary Serbo-Croatian Literature
Su. 3 cl.
Prereq.: 605 and 621, or permission of instructor.
Prose and poetry since 1945; emphasis on Andric, Cosic, Lalic, Davico, Erich Kos, Kivaza, and Ralcovic.

821* G 5
The Structure of Serbo-Croatian
Su. 3 cl.
Prereq.: 606 or permission of instructor.
Analysis and description of the phonological and morphological systems of contemporary literary Serbo-Croatian. Naylor.

993 G 2-10
Individual Studies
Prereq.: Permission of chairman.
Repeatable to a maximum of 40 cr. hrs. in any combination of decimal subdivisions.
993.01 Literature to 1850
993.02 Literature from 1850-1918
993.03 Literature since 1918
993.04 Morphology
993.05 Phonology
993.06 Dialectology
993.07 Old Serbian
993.08 Unspecified

994 G 2-10
Group Studies in Serbo-Croatian
A.
Prereq.: Permission of chairman.
Repeatable to a maximum of 15 cr. hrs.
Slavic Languages and Literatures

Office: 204 Dieter Cunz Hall of Languages, 1841 Millikin Road

230  (530)  U 5
Slavic Languages and Cultures
A. 4 cl.
Taught in Engl.
Emphasis on Slavic distribution, contemporary situation, language policies of Slavic nations; interaction of Slavic cultures and their commoners and neighbors; mutual impact of Slavic languages and cultures.

519  UG 5
Slavic Literature in English Translation from the Beginning to the Present
Ep. 4 cl.
Emphasis on masterpieces of non-Russian Slavic literatures; epic tradition, Khecnowski, Comelius, Obradovic, Mickiewicz, Shevchenko, Macha, Sienkievicz, Remont, Franko, Ukrainka, Vazov, Capek, Hasek, and Andric.

693  (701)  UG 2-10
Individual Studies in Slavic
Prereq.: Permission of department chairman.
Repeatable to a maximum of 15 cr. hrs.
693.01 Literature, East Slavic
693.02 Literature, South Slavic
693.03 Literature, West Slavic
693.04 Literature, unspecified
693.05 Linguistics, East Slavic
693.06 Linguistics, South Slavic
693.07 Linguistics, West Slavic
693.08 Linguistics, unspecified
693.09 Church Slavonic
693.10 Linguistics, Balto-Slavic
693.11 Unspecified

H783  U 3-5
Honors Course
Prereq.: 4th yr. standing; a grade of A in at least half of the Slavic courses taken and an average of B in the remainder; permission of instructor under whose supervision the work is to be completed and the College Committee on Honors. Failure to receive a grade of B in this course is a disqualification for special honors.
Repeatable to a maximum of 15 cr. hrs.

794  UG 2-10
Group Studies in Slavic
Prereq.: Permission of chairman.

800  G 3
Bibliography and Method
A. 2 cl.
Not open to students with credit for 880.
Prereq.: Good command of Russ., and acquaintance with a second Slavic language or permission of instructor.
Prereq.: Good command of Russ., and acquaintance with a second Slavic language or permission of instructor.
Bulgarian, Macedonian, Serbo-Croatian, and Slovenian, with emphasis on Serbo-Croatian and its relation to other South Slavic Languages. Naylor.

861*  (731)  G 5
History of South Slavic Languages
Su. 3 cl.
Prereq.: Good command of Russ. and acquaintance with a second Slavic language or permission of instructor.
Prereq.: Good command of Russ. and acquaintance with a second Slavic language or permission of instructor.
Bulgarian, Macedonian, Serbo-Croatian, and Slovenian, with emphasis on Serbo-Croatian and its relation to the other South Slavic Languages. Naylor.

862*  (732)  G 5
History of the West Slavic Languages
W. 3 cl.
Prereq.: Good command of Russ. and acquaintance with a second Slavic language or permission of instructor.
Prereq.: Good command of Russ. and acquaintance with a second Slavic language or permission of instructor.
Polish, Czech, Slovak, Polabian, Kashub, and Sorbian, with special emphasis on Polish and its relation to the other West Slavic languages. Robinson.

864*  G 5
Comparative Slavic Grammar
Sp. 3 cl.
Prereq.: 860 or permission of instructor.
Prereq.: 860 or permission of instructor.
Development of Indo-European phonology and morphology into Common Slavic, and the developments in contemporary Slavic languages.

870  G 3-5
Seminar in Slavic Philology
Su. 2 cl.
Historical and comparative studies in the Slavic languages and related language families, including Baltic and Finno-Ugric. Robinson.
Social Work

Office: 300 Stillman Hall, 1947 North College Road

Professors: Medhurst (Director), Ratchev (Emeritus), Cornell, Livingston, Mark (Emeritus), Parnicky, Rosner, L. Schneiderman, and Shimpy, Associate Professors; Andrews, Behling, Billups, Blackburn (Emeritus), Bounos, Crymes, Daykin, Decker, Hamilton, Hayward, Longo, Miller, Mueller, Nichols, H. Schneiderman, and Sisson; Assistant Professors: Bailey, Bendekovic, Curtis, D’Angelo, Foster, Gilbert, Good, McMillin, Pantalos, Pillow, Rindfleisch, Sze, and Zupancic; Instructors: Ain, Danduran, Dantin, and Shilling.

323 (599) U 4
Problems, Policies, and Programs in Social Welfare I
A, W, Sp. 2 2-hr. cl.
Prereq.: Sociol. 101, 201, 220, or equiv.
An introduction to the values, value conflicts, and major goals in the American social welfare system.

325 (600) U 4
Problems, Policies, and Programs in Social Welfare II
Su, A, W, Sp. 2 2-hr. cl.
Prereq.: 323 or equiv.
Examination of the interrelationships among various social problems, social welfare programs, policy issues, and the role of social work in terms of the American social welfare system.

380 (511) U 5
Introduction to Research Methods in Social Work
A, W, Sp. 3 cl., 1 2-hr. lab.
Prereq.: Math. 121 or equiv.
Not open to students with credit for 330.
Science and society; research design; measuring variables; data collection, processing and analysis; participation in a research project is required.

415 (675) U 1-8
Introduction to Field Practice
Su, A, W, Sp. Social Agency Assignments, 1 2-hr. seminar.
Prereq.: Social Welfare 3rd or 4th yr.; standing and permission of Social Welfare Course.
Repeatable to a maximum of 15 cr. hrs.
Observation and analysis of social welfare organizations and their service functions; assumption of a progressively responsible service-giving role within an organization used by the school as a teaching center.

431 U 4
Determinants of Social Functioning I
A. 2 2-hr. cl.
Prereq.: Senior standing or permission of instructor.
Introduction to individual, group, organizational, and community determinants of social functioning with attention to stress and sub-cultural processes and conditions.
Determinants of Social Functioning II
W. 2 1/2-hr. cl.
Prereq.: 432.
Introduction to the basic determinants of individual and family social functioning, using a life cycle approach from marriage through children's latency.

Determinants of Social Functioning III
Sp. 2 1/2-hr. cl.
Prereq.: 432.
Introduction to the basic determinants of individual and family functioning, using a life cycle approach, from children's latency through aging years of parents.

Social Work Practice I
Su, A, W, Sp. 2 1/2-hr. cl.
Prereq.: 432 and 4th yr. standing.
Not open to students with credit for 423.
The structure of social work, its dimensions, parameters, and functions.

Social Work Practice II
Su, A, W, Sp. 2 1/2-hr. cl.
Prereq.: 432 and 4th yr. standing.
Not open to students with credit for 425.
Social worker roles, activities, and responsibilities.

Social Work Practice III
Su, A, W, Sp. 2 1/2-hr. cl.
Prereq.: 445 and 4th yr. standing.
Not open to students with credit for 427.
Development of a conceptual framework for social work practice.

Special Problems
Prereq.: Social Welfare 3rd or 4th yr. standing, 327, and permission of instructor.
Repeatable to a maximum of 10 cr. hrs.
Individual or group study projects on problems and services in selected area of social welfare; report required.

Juvenile Delinquency: Its Treatment and Prevention
A, W, Sp. 2 2-hr. cl.
Prereq.: 325, Anthrop. 261, Soc. 410 or equiv.
Juvenile delinquency as a social problem; methods of treatment and prevention, including juvenile courts, clinics, probation, parole, correctional institutions, child placement, and recreational programs.

Social Implications in Rehabilitation
A, Sp. 3 cl.
Prereq.: 3rd or 4th yr. standing and permission of instructor.
Not for grad. credit to students in Soc. Work.
The significance of disability and employment in their social, medical, and industrial application; rehabilitation as a process; current concepts.

Social Work and Health Services
W. 3 cl.
Prereq.: 4th yr. standing or permission of instructor.
The nature, organization, and function of programs, facilities in the health practice field; the social and economic implications of chronic disease.

Legal Aspects of Social Work
A, W, Sp. 3 cl.
Prereq.: 3rd or 4th yr. standing or permission of instructor.
Not for grad. credit to students in Soc. Work.
Law as a means of social control; study of case, statute, and constitutional law most frequently involved in social work practice; legal aid.

Field Practice I
Prereq.: Soc. Work 1st yr. grad. standing.
Arranged by the student's faculty adviser.
Not open to students with credit for 585.
Repeatable to a maximum of 18 cr. hrs.
Planned visits to social agencies, group analysis of observation, followed by assignment to specific agency for beginning responsibilities with recipients of agency service.

Social Welfare Policies and Programs I
A. 2 2-hr. cl.
Not open to students with credit for 520.
Historical and comparative analysis of social welfare systems; their relationship to change in the basic social institutions of family, church, government, and economic institutions.

Social Welfare Policies and Programs II
W. 2 2-hr. cl.
Prereq.: 520 or equiv.
Not open to students with credit for 522.
The development of a conceptual model for social welfare policy and program analysis.

Dynamics of Social Functioning I
A. 2 2-hr. cl.
Prereq.: Grad. standing and permission of instructor.
Not open to students with credit for 530.
Dynamics of social functioning examined at the individual, group, and community levels of analysis, with attention to stress, subcultural, and socio-economic processes and conditions.
Dynamics of Social Functioning II
W. 2 1/2-hr. cl.
Prereq.: 631 or permission of instructor.
Not open to students with credit for 532.
Dynamics of individual and family social functioning as typically experienced and as occurs in response to stress, from conception through latency.

Dynamics of Social Functioning III
Sp. 2 1/2-hr. cl.
Prereq.: 632 or permission of instructor.
Not open to students with credit for 534.
Dynamics of individual and family social functioning as typically experienced and as occurs in response to stress, from adolescence through aging years of parents.

Social Work Practice Theory I
A. 2 1/2-hr. cl.
Prereq.: Soc. Work grad. standing; concur. 615.
Fundamentals of social work practice: practice components, interactional processes, units of attention, and framework of practice.

Social Work Practice Theory II
W. 2 1/2-hr. cl.
Prereq.: Soc. Work grad. standing and 641; concur. 615.
Strategies for intervention; differential modes of practice to affect functioning and development of individuals and groups.

Social Work Practice Theory III
Sp. 2 1/2-hr. cl.
Prereq.: Soc. Work grad. standing and 642; concur. 615.
Analysis of practice concepts: formulation and operationalization of conceptual hypotheses.

Research Methods in Social Work
Sp. 2 2-hr. cl., 1 2-hr. lab.
Prereq.: Soc. Work grad. standing, 380 or equiv.
Not open to students with credit for 540.
Formulating researchable questions and hypothetical answers for testing, measurement, research design, data collection and processing, statistical analysis, and reporting results.

Individual Studies
Prereq.: Soc. Work grad. standing and permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Not open to students with credit for 640.
Directed readings and tutorials related to specific problems in the following areas.
  c. Social Welfare Policy and Programs.
  d. Social Functioning.
  e. Research.
  f. Other.

Seminars in Social Welfare Policy and Program Analysis
A, W. 1 1/2-hr. cl.
Prereq.: 541 or equiv. and permission of instructor.
Repeatable to a maximum of 8 cr. hrs.
  a. Aging
  b. Family Planning
  c. Health Care
  d. Housing and Urban Development
  e. Income Maintenance
  f. International Social Welfare
  g. Mental Retardation
  h. Other

Field Practice II
Prereq.: Soc. Work 2nd yr. grad. standing and 615 or equiv.
Repeatable to maximum of 26 cr. hrs.
Not open to students with credit for 685.
Application of social work theory in selected social agency settings; joint direction and evaluation by agency staff and faculty.

Social Welfare Policies and Programs III
Sp. 2 1/2-hr. cl.
Prereq.: Soc. Work grad. standing, 621 or equiv.
Not open to students with credit for 624.
Analysis and critical evaluation of social welfare policy and issues; role of the profession in affecting policy.

Seminar in Social Functioning
A. 2 1/2-hr. cl.
Prereq.: Soc. Work grad. standing, 653 or equiv.
Not open to students with credit for 630.
Repeatable to a maximum of 9 cr. hrs.
Presentation and critical examination of personality, interactional, small group, organizational and community concepts and approaches used in analyzing social dysfunctioning.

Seminars in Clinical Aspects of Social Work Practice
A, W, Sp. 2 1/2-hr. cl.
Prereq.: Soc. Work grad. standing and 643.
Repeatable to a maximum of 9 cr. hrs.
Concepts and strategies for enhancing social functioning and human realization of individuals, families, and groups; subjects ranging from clinical practice formulations through treatment milieux.

Seminars in Administrative Aspects of Social Work Practice
A, W, Sp. 2 1/2-hr. cl.
Prereq.: Soc. Work grad. standing and 643.
Repeatable to a maximum of 9 cr. hrs.
Concepts and strategies for transforming organizational resources into effective delivery of services; topics include administrative, supervisory, consultative, and inter-organizational practitioner roles.
Seminars in Social Change Aspects of Social Work Practice
A, W, Sp.  2 1/2-hr. cl.
Prereq.: Soc. Work grad. standing and 643. Repeatable to a maximum of 9 cr. hrs.
Concepts and strategies for affecting institutional functioning and development at local, regional, national, or international levels; subjects range from community development formulations through social planning and deployment of resources to political and para-political activities.

Seminar in Social Work Practice Issues
Sp.  1 cl.
Prereq.: Soc. Work grad. standing and 643. Identification, critical examination, and development of a point of view concerning selected issues arising in or impinging upon social work.

Seminar in Social Work Research Critique
Prereq.: Soc. Work grad. standing, 680 or equiv. Repeatable to a maximum of 6 cr. hrs. Evaluation of selected research reports with reference to their relevance to social work and soundness of methodology; written and oral presentation required.

Group Research Project
Prereq.: Soc. Work grad. standing, 680 or equiv. Repeatable to a maximum of 6 cr. hrs. Student and faculty participation in the development of a research project at the School or a teaching center; jointly authored research report required.

Seminar on the Application of Experimental Designs to Social Work Research
Sp.  1 1/2-hr. cl.
Prereq.: 680 or equiv.
Evaluating the plausibility of findings from research using experimental designs as compared with the plausibility of findings from other designs when an experimental design was feasible.

Group Studies
Prereq.: Soc. Work 2nd yr. grad. standing. Not open to students with credit for 694.
Group seminars in areas of curriculum as follows:
  c. Social Welfare Policy and Programs.
  d. Social Functioning.
  e. Research.
  f. Other.

Seminar in Social Work Education
Sp.  3 cl.
Prereq.: M.S.W. or permission of instructor.
Development of social work education in North America; problems and issues in curriculum building, teaching methods, and class and field instruction.

Seminar in Social Welfare Policies and Programs I
A.  3 cl.
Prereq.: M.S.W. or permission of instructor.
Historical view of policy formation as influenced by political, economic, and social conditions; analysis and evaluation of processes involved in major developments.

Seminar in Social Welfare Policies and Programs II
W.  2 cl.
Prereq.: 820 or permission of instructor.
Analysis of demographic, political, economic, and other influences upon social policy planning; evaluation of policy planning effectiveness.

Seminar in Social Welfare Policies and Programs III
Sp.  3 cl.
Prereq.: 821 or permission of instructor.
Critical analysis of selected current issues in social policy such as population control, income maintenance, federal, state, and local role in comprehensive social service programs.

Seminar in Social Functioning I
W.  3 cl.
Prereq.: M.S.W. or permission of instructor.
Critical examination of selected biological, psychological, and social determinants of social functioning and dyadic, small group, organizational, and community levels of analysis.

Seminar in Social Functioning II
Sp.  3 cl.
Prereq.: 831 or permission of instructor.
Problems in knowledge selection and conceptualization as related to social work practice and the biological, behavioral, and social sciences.

Seminar in Social Work Practice I
W.  3 cl.
Prereq.: M.S.W. or permission of instructor. Examination of the nature of social work practice; critical analysis of the underlying assumptions and theoretical base of social work methods.
Sociology

Office: 112 Hagartry Hall, 1793 South College Road

Professors Zetterberg (Chairman), Clarke (Vice-Chairman), Berry (emeritus); Bullock, Cowin, Cuber, Dinitz, Dynes, Jonassen, Mangus (emeritus), Nagi, Oxier, Petersen, Quarantelli, Reckless (emeritus), Schirman, Stetito, and Tien; Assistant Professor Polkan; Associate Professors Franklin, Heltrich, Nissen (emeritus), Noel, VanderZanden, and Zarate; Adjunct Associate Professor Martin; Assistant Professors Card, Chaterworthy, Li, Roth, and Wyson; Instructor Sebo; Visiting Assistant Professors Busch, Smith, and Walum.

101 (401) U 5
Introductory Sociology
Su, A, W, Sp. 5 cl.
Not open to students with credit for 201 or equiv. or Rur. Soc. 105 or equiv.
Fundamental concepts of sociology and an introduction to the analysis of social problems. Cuber and Staff.

201 (507) U 5
Fundamentals of Sociology
A, W, Sp. 5 cl.
Prereq.: Hist. 123 or equiv.
Not open to students with credit for 101 or equiv.
Nature of society and the factors affecting its development, culture, personality, groups and institutions; selected social problems.

202 (402) U 5
Social Trends and Problems
Su, A, W, Sp. 5 cl.
Prereq.: 6 cr. hrs. in Soc. or equiv. with permission of instructor.
Analysis of recent social trends and contemporary social problems. Dinitz and Staff.

206 (518) U 3
Social Implications of Low Income
Sp. 3 cl.
Prereq.: 5 cr. hrs. in Soc. or equiv. with permission of instructor.
A study of low-income peoples, especially concerning the effect of low-income on them, and their consequent social participation.
207  (562)  U  5
Social Change
A, W, V.  2 cl.
Prereq.: 5 cr. hrs. in Soc. or equiv. with permission of instructor.
Recent social changes, especially in Western civilization and the United States; types of societies in historical perspective; requirements of a good society. Sebo.

208  (620)  U  3
Contemporary Social Criticism
W.  3 cl.
Prereq.: 101 or 201 or equiv.
A critical analysis of intellectual controversies and issues underlying a variety of contemporary movements and ideologies.

220  (407)  U  4
Sociology of Education
Su, A, Sp.  4 cl.
Prereq.: 5 cr. hrs. in Soc.
Current social trends as they affect education; backgrounds of school children, social status of teachers, role of power and bureaucracy. Corwin and Sebo.

250  (530)  U  5
Types of Sociological Inquiry
A, W, Sp.  3 cl., 2 2-hr. lab.
Prereq.: 5 cr. hrs. in Soc. or equiv. with permission of instructor.
Introduction to sociological research techniques, methodological approaches, and relevant quantitative procedures. Buillock and Sletto.

280  (506)  U  4
American Minority Relations
A, Sp.  4 cl.
Prereq.: 101 or equiv., and permission of instructor.
Not open to students with credit for 408 or equiv.
Survey of the attitudes and relationships arising from the contacts of various racial and ethnic groups in the United States. Noel and VanderZanden.

290  (505)  U  5
The Sociology of Urban Life
A, Sp.  4 cl., 1 2-hr. lab.
Prereq.: 5 cr. hrs. in Soc. or equiv. with permission of instructor.
The place of the city in social organization; the emergence, nature, and problems of modern urbanism; projects based on census and field data. Jonassen and Schwirian.

284  U  3-5
Group Studies
A.
Prereq.: 101.
Repeatable to a maximum of 10 cr. hrs.
Topics vary each quarter offered.

330  (520)  U  3
Varieties of Modern Marriage
Su, A, W, Sp.  3 cl.
Examination of sociological and social-psychological research describing and interpreting emerging pluralistic patterns of man-woman and parent-child relationships. Cuber and Clatworthy.

395  (638)  U  3
Population Dynamics and Social Change
W, Sp.
Prereq.: 10 cr. hrs. in Soc. or equiv. and permission of instructor.
Changes in size, composition, and distribution of populations, the dynamics underlying them, and their social consequences. Petersen and Zerate.

405  (623)  U  3
Collective Behavior and Social Movements
A, Sp.  3 cl.
Examination of the dynamic social processes characteristic of mass societies through an analysis of crowds, mobs, cults, publics, and the initial stages of social movements. Quinette and Roth.

410  (625)  U  5
Criminology
Su (1st term), A, W, Sp.  5 cl.
Prereq.: 3rd yr. standing.
The nature, variation, and causes of crime and delinquency: studies of criminal liability, criminal careers, and organized racketeering. Dinitz and Reckless.

411  (626)  U  5
Penology
A, Sp.  5 cl.
Prereq.: 410 or equiv.
The treatment of adult offenders in detention and incarceration; short and long term institutions; field trips required. Smith. Fee.

430  (600)  U  4
Sociology of the Family
A, Sp.  4 cl.
Analysis of relationships between the family and the larger society including mate selection, status of women, and patterns of husband-wife and parent-child relationships. Clarke and Cuber.

434  (680)  U  4
The Child and Society
W.  4 cl.
A study of the ways in which society socializes children; current breakdown in the socializing processes and implications for the school and other educational agencies. Clarke.

462  (644)  U  3
Sociology of Organizations
W.  3 cl.
Prereq.: 10 cr. hrs. in Soc. or permission of instructor.
Functioning of large complex social groupings; goals, structures, coordination, dispersion, survival, change as seen in various organizations: e.g.—governmental, educational, religious, business, and occupational organizations. Corwin.

463  (676)  U  4
Social Stratification
Su (1st term), A, W, Sp.  4 cl.
Class distinction as a phase of social differentiation; origin and characteristics of social class; significance for modern society of class consciousness, class struggle, and social mobility. Dyens and Card.
464 (512) U 3
Human Relationships in Industry
W, Sp. 3 cl.
Social processes and problems associated with contemporary industry including growth of formal and informal organizational structure, communication processes, attitude problems, and morale. Helrich.

465 (645) U 4
Work and Leisure in Mass Society
Sp. 4 cl.
An analysis of current relationships between work and leisure, emphasizing social implications of increased leisure time and changing conceptions of work and leisure. Clarke.

467 (548) U 3
Religious Institutions in Modern Society
W, Sp. 3 cl.
The social role of religious institutions and beliefs, with particular reference to the United States; the relation between religion and other aspects of society. Dynes.

470 (622) U 5
Social Factors in Personality
W, Sp. 5 cl.
Prereq.: Junior standing and 101.
Analysis of relationships between social structure and personality; language; its consequences for social behavior; socialization: learning of motives and social roles; personality: development, organization, and disorganization. Roth and Franklin.

480 (604) U 3
Comparative Race Relations
A, W. 3 cl.
Prereq.: Junior standing and 101.
Analysis of variations in patterns of race relations in diverse institutional settings with particular emphasis on Brazil, South Africa, and the United States. Martin, Noel, and VanderZanden.

488 (660) U 5
Development of Sociological Thought
A, W. 5 cl.
Prereq.: 15 cr. hrs. in Soc. or equiv.
A survey of major concerns and conceptions in sociology in relation to their social-historical setting from 1800 to the present time. Walkin.

503 (621) U G 5
Contemporary Soviet Society
Sp. 5 cl.
Prereq.: 10 cr. hrs. in Soc. and 15 cr. hrs. in other social sciences, or permission of instructor.
Not open to students with credit for 403.
Organization, development, and problems of the Communist Party, the collective farm, the school, professional occupations, economic planning, and other contemporary Soviet institutions. Cardi.

545 U G 5
American Society
W. 5 cl.
Prereq.: Junior standing with a cumulative point-hour ratio of at least 3.0.
An exposition of the structural patterns of American society, using sociological theories and data but integrating them into a general view. Petersen.

560 (677) U G 4
Comparative Social Organizations
A. 4 cl.
A comparative analysis of organizational characteristics and functioning in different cultural settings. Dynes.

590 (614) U G 4
The Community
W. 4 cl.
Development of the modern community; approaches to the study of communities; significance of processes and value systems for community organization and disorganization. Jonassen.

592 (678) U G 3
The School and the Community
W. 3 cl.
Not open to students with credit for 492.
The school as a social institution in the American community; the sociological importance of community structures, processes and problems in determining school-community relationships. Jonassen.

601 (603) U G 4
Comparative Family Organization
W. 4 cl.
Prereq.: Junior standing and 101.
Not open to students with credit for 432.
Analysis of family organizations in various societies, emphasizing the impact of changing world conditions on family and kinship structures. Clarke, Cuber, and Zarate.

608 (627) U G 3
Sociological Aspects of Mass Communication
W. 3 cl.
Selective analysis of communicators, contents, audiences, and effects of mass media; research procedures, findings, and theoretical formulation, drawn primarily from studies of popular culture. Guarnantelli.

610 U G 5
Sociology of Deviant Behavior
Sp. 5 cl.
Prereq.: 20 cr. hrs. in Soc. or related fields.
An examination of the nature, types, and societal reactions to deviant behavior; special emphasis on the process of stigmatization and the emergence of deviant subcultures. Dinitz.

612 U G 5
The Sociology of Economic Life
A. 3 cl., 2 hrs. arr.
Study of the relationship between economic and noneconomic aspects of life; theory will be supplemented by related research. Helrich.
615 (725) **U G 3**
Control and Prevention of Crime and Delinquency
A. 1.2 hr. cl. One field project.
Prereq.: 410 or equiv.
Analysis of the operational effectiveness of special measures and programs pointed toward the control and prevention of crime and delinquency. Dinitz and Reckless.

619 **U G 5**
Demographic Analysis
W. 5 cl.
An exposition of census data and vital statistics, demographic rates, life tables, cohort analysis, and similar elementary techniques and data sources in demography. Li, Petersen, and Zarate.

623 **U G 5**
Advanced Sociology of Education
W. 5 cl.
Not open to students with credit for 523.
Comparisons of the structures and functions of educational systems, elementary through university; recruitment and allocation of personnel and resources, power, conflict, and boundary maintenance. Corwin.

650 (630) **U G 5**
Introduction to Quantitative Research Techniques in Sociology
A. W. 5 cl.
An introduction to the analysis of sociological data; measurement theory and techniques of interpretation; sampling procedures in sociological research and implications for inference and generalization. Bullock, Schwirian, and Sletto.

651 **U G 5**
Approaches to Sociological Inquiry
A. W. 5 cl.
Theory and practice in essentials of the research process; comparison of alternative approaches and design models; questionnaire construction, interview techniques, and related problems.

666 **U G 3**
Political Sociology
Sp. 3 cl.
Examination of structural and cultural factors as related to the nature of political systems; consideration of the organization and roles of political and para-political groups. Zetterberg.

693 (700) **U G 1-5**
Individual Studies
Prereq.: Sociol. majors and permission of instructor.
693.01 Sociological Theory
693.02 Social Organization and Planning
693.03 Medical Sociology
693.04 Criminology and Penology
693.05 Sociology of Education
693.06 Race Relations
693.07 Social Psychology
693.08 The Family
693.09 Research Methodology
693.10 Urban Sociology
693.11 Undergraduate Seminar on Contemporary Sociological Issues
693.12 Unclassified
693.13 Population

694 **U G 3-5**
Group Studies
A. W. Sp.
Repeatable to a maximum of 10 cr. hrs. for each decimal subdivision.
Topics vary each quarter offered.
694.01 Sociological Theory
694.02 Social Organization
694.03 Medical Sociology
694.04 Criminology and Penology
694.05 Sociology of Education
694.06 Race Relations
694.07 Social Psychology
694.08 The Family
694.09 Research Methodology
694.10 Urban Sociology
694.11 Contemporary Sociological Issues
694.12 Unclassified
694.13 Population

695 **U G 3**
Seminar in Sociological Perspectives on Modern Education
A. 3 cl.
Repeatable to a maximum of 9 cr. hrs.
A seminar involving survey and analysis of sociological literature and research regarding the structure, function, personnel and performance of the educational institution in modern society. Bullock.

GENERAL PREREQUISITES FOR COURSES NUMBERED 700
Unless otherwise indicated, the prerequisites for 700-level courses are 30 qtr. hrs. in the same discipline numbered 400 or higher of which 15 hrs. must be at the 600 level.

Introduction to National Security
(See Nat. Sec. Pol. S. 702.)

704 (767) **U G 5**
Problems in the Design of Sociological Research
A. W. Sp. 5 cl.
Prereq.: 250 or equiv.
Repeatable to a maximum of 10 cr. hrs.

705 **U G 5**
Construction and Verification of Theory
A. 5 cl.
Prereq.: 250 or equiv.
Not open to students with credit for 704.01.
Repeatable to a maximum of 10 cr. hrs.
706 U G 5

Experimental Research Methods
W. 5 cl.
Prereq.: 250 or equiv.
Not open to students with credit for 704.02.
Repeatable to a maximum of 10 cr. hrs.
Survey and analysis of research designs and statistical techniques permitting control and/or assessment of error variance in sociological research by experimental method. Bullock.

707 U G 5

Problems in Quantitative Analysis
Sp. 5 cl.
Prereq.: 250 or equiv.
Not open to students with credit for 704.03.
Repeatable to a maximum of 10 cr. hrs.
A survey of advanced problems in the multivariate analysis of sociological data; topics covered include elaboration and specification, causal inference in nonexperimental research and path analysis. Schwirian, Nagi, and Bullock.

708 U G 5

Problems in Qualitative Analysis
Sp. 5 cl.
Problems and techniques of non-quantitative data analysis including case studies, participant observation, field diary, autobiography, and historical records. Dynes and Quadrantell.

730 (550) U G 5

Medical Sociology
W. 5 cl.
Prereq.: 25 cr. hrs. in Soc. or permission of instructor.
Not open to students with credit for 440.
Sociological analysis of health and illness behavior, the social ecology of illness, health organization, and the health professions. Nagi and Wylong.

752 (706) U G 5

Principles and Techniques of Scale Construction
W. 5 cl.
Prereq.: 550 or equiv. or Soc. Work 540.
Approaches and techniques in the development and testing of social measurement instruments. Bullock and Sletto.

770 U G 5

Individual in Society
W. 5 cl.
Analysis and synthesis of the major theories and findings of social psychology. Franklin.

772 U G 5

Small Groups
A. 5 cl.
Not open to students with credit for 661.
Analysis of group structure and processes; examination of roles, interpersonal structure, leadership, observation of groups in laboratory and non-laboratory settings. Roth.

780 U G 3

Racial and Ethnic Differentiation
A. 3 cl.
An analysis of the origin, persistence, adaptation and change of systems and racial and ethnic differentiation. Noel and VanderZanden.

781 U G 5

The Traditions of Social Thought and Research
A. 2 2-hr. cl.
The history of Sociology with special emphasis on ideas relevant to current theoretical issues and research methods. Walum and Zetterberg.

782 U G 5

Contemporary Theoretical Orientations in Sociology
W. 2 2-hr. cl.
Not open to students with credit for 865 or 891.
Analysis of current schools, outlooks, and issues. Walum.

Research Principles and Techniques in National Security
(See Nat. Sec. Pol. S. 785.)

790 U G 3

Seminar in Community Organization
A. 3 cl.

791 (714) U G 3

Sociological Methods of Community Analysis
Sp. 3 cl.
Prereq.: 290 or 590 or equiv., and permission of instructor.
Not open to students with credit for 894.
Methods, techniques, sources of data, and objectives of community analysis. Jonassen and Schwirian.

792 U G 5

Structural Sociology
A. 5 cl.
Prereq.: Grad. standing in Soc.
Key concepts, issues, recent trends in the study of social structure with special emphasis on formal social organizations, social stratification, comparative social systems, groups and research methods. Corwin and Dynes.

GENERAL PREREQUISITES FOR COURSES
NUMBERED 800
Unless otherwise indicated, the prerequisites for 800-level courses are 30 qtr. hrs. in the same discipline at the 600-level or higher, of which 15 hrs. must be at the 700-level.

800 G 2

Pro-seminar in Sociology
A. 2 cl.
Open only to 1st year grad. students in Soc.
Each week an area of specialization within Sociology will be discussed by a professor whose major interest is in that area; provides an overview of special topics and current issues.
801** G 3
Seminar in the Comparative Study of Society: Latin America
Sp. 3 cl.
Selected problems in the changing interrelationships among social institutions in Latin American Countries: politics, economy, education, religion, kinship, and mass media. Zarate.

802** G 3
Seminar in the Comparative Study of Society: The Middle East
Sp. 3 cl.
Selected problems in the changing interrelationships among social institutions in the Middle Eastern Countries: politics, economy, education, religion, kinship, and mass media. Nagi.

803* G 3
Seminar in the Comparative Study of Society: The Slavic Countries
A. 3 cl.
Selected problems in the changing interrelationships among social institutions in the Slavic Countries: politics, economy, education, religion, kinship, and mass media. Card.

804** G 3
Seminar in the Comparative Study of Society: Advanced Societies
W. 3 cl.
Analysis of emerging problems in the social order of advanced societies, with special emphasis on the Atlantic Community.

805 G 5
Social Movements
Sp. 4 cl.
An examination of theories and research on non-traditional group efforts to change social systems and institutions; emphasis on contemporary societies and movements. Quarantelli.

807 G 5
Advanced Demographic Analysis
Sp. 5 cl.
Prereq.: 619.
An exposition of advanced applications of the life table, stable population models, estimates from incomplete data, projections and interpolations, and similar demographic techniques. Li and Petersen.

811 G 1-5
Seminar in Industrial Sociology
A.
Repeatable to a maximum of 10 cr. hrs.
Selected topics in sociology of industrial and work relations: organizational types, change, effectiveness, management, control, administration, leadership, occupations; theoretical approaches to study of industrial relations. Bullock and Helfrich.

818 (864) G 3
Advanced Criminology
Sp.
Prereq.: 410 or equiv.
A critical study of the most important aspects of criminology. Dinitz and Reckless.

820 G 3
Seminar in the Sociology of Education
Sp. 3 cl.
Repeatable to a maximum of 6 cr. hrs.
Special problems will be considered in different quarters, including urban education, student movements, bureaucratic-professional problems, school-community relations, and innovation.

825* G 5
Seminar in the Sociology of Science
Sp. 3 cl.
Selected problems in the study of science as a changing social institution including its relations to other institutional realms viewed in a cross-national context. Corwin and Nagi.

830* G 3
Seminar in Medical Sociology: Problems in the Sociology of Health Organization
Sp. 3 cl.
Prereq.: 730 or permission of instructor.
Analysis of theory and research bearing upon the role of medicine in society and the health organizations on national, community, and institutional levels. Nagi.

831** G 3
Seminar in Medical Sociology: Problems in the Sociology of Mental Illness
W. 3 cl.
Prereq.: 730 or permission of instructor.
Analysis of the sociological concepts of mental illness, the socio-cultural factors in these disorders, and the structure of mental care institutions.

832** G 3
Seminar in Medical Sociology: Problems in the Social Ecology of Illness
Sp. 3 cl.
Prereq.: 730 or permission of instructor.
Analysis of current research and literature about socio-cultural factors in disease and illness; emphasis placed upon methodological problems.

8331* G 3
Seminar in Medical Sociology: Problems in Social Gerontology
A. 3 cl.
Prereq.: 730 or permission of instructor.
Analysis of the social processes and demographic changes associated with aging, and the place of the aged in the social structure. Mangus.

836* G 3
Seminar in the Professions
W. 3 cl.
Advanced comparative analysis of various professions in the United States and other societies; professionalization and the organization and influence of professions. Clarke, Corwin, and Nagi.
837 G 5
Seminar in Public Opinion
and Political Sociology
A. 5 cl.
Prereq.: Permission of instructor.
Selected problems in the study of opinions and
opinion climates, with special emphasis on their
relation to elections and political institutions in a
cross-national context. Zetterberg.

840* G 5
Social and Cultural Foundations
of Cities and Urbanization
W. 5 cl.
An examination of cultural, material, social, political
and psychological factors associated with the genesis and nature of
urbanization.Jonassen and Schirian.

841* G 5
Sociology of Urban Sub-Communities
W. 5 cl.
Examination of society and culture of sub-communities such as ethnic and racial ghettos, suburbia;
generalizations about the pattern of integration with larger systems. Jonassen and Schirian.

842 G 5
Human Ecology
A. 5 cl.
Repeatable to a maximum of 10 cr. hrs.
Selected problems of urban structure from the ecological perspective. Schirian.

846 G 5
Seminar in the Demography of Urbanization
Sp. 5 cl.
Prereq.: Grad. standing in Soc. or related discipline;
A course in population or urban sociology recommended.
An analysis of urban phenomena using demographic data and techniques; an analysis of the effect of
urbanization on demographic processes. Pettaisen.

848* G 3
Seminar in the Sociology of Religion
Sp. 3 cl.
An analysis of selected contemporary problems in the
soiology of religion; religious organization and
involvement. Dyres.

850 G 1-5
Seminar in Sociological Research Methods
Repeatable to a maximum of 30 cr. hrs.
Special topic seminars in research methodology.

859 (808) G 1-15
Practicum in Sociological Research
W, Sp.
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Supervised practical experience in the independent
execution of sociological research, the application of
appropriate analytical techniques, and preparation of
research reports.

861* G 3
Seminar in Social Stratification
W. 3 cl.
Repeatable to a maximum of 6 cr. hrs.
Major theoretical approaches, differing bases of
stratification and methods of analysis. Dyres.

862 G 3
Seminar in Complex Organizations
A. 3 cl.
Analysis of bureaucratization, structure, boundary
problems, resource allocation, organizational change
and conflict. Corwin and Dyres.

863 G 3
Seminar in Small Groups
Sp.
A critical examination of theoretical and
methodological issues in research on small groups;
focus on sociological contributions.

871 G 5
Symbolic Interaction
A. 5 cl.
Analysis of the relationship between the individual and
the social structure; particular reference paid to the
symbolic interaction orientation. Franklin.

872 G 5
Social Psychology in a Comparative
Sociological Perspective
W. 4 cl.
Contemporary social psychological research in other
nations; major consideration of the value and
normative structures which help to explain discrepant
findings. Roth.

873 G 5
Current Research in Social Psychology
of Relevance to Sociology
Sp. 4 cl.
Analysis of theoretical developments, methodological
approaches and empirical findings on special recent
topics. Roth.

880* G 5
Seminar in Contemporary Issues
in American Race Relations
A, Sp. 5 cl.
Prereq.: 780.
Repeatable to a maximum of 10 cr. hrs.
Issues in contemporary American race relations are
examined to facilitate theoretical clarification; specific
seminar topics vary from quarter to quarter.
Vander Zanden.

881** G 5
Seminar in Theoretical Issues
in Comparative Race Relations
Sp. 5 cl.
Prereq.: 780.
Repeatable to a maximum of 10 cr. hrs.
Cross-cultural examination of stability and change in
patterns of race and ethnic relations; specific seminar
topics vary from quarter to quarter. Noel.
Spanish

Office: 240 Dieter Curb Hall of Languages, 1841 Millikin Road

Professors Bulatkin (Chairman), Armitage, Babcock, Froisch, Griffin, and Rogers (Emeritus); Associate Professors Levisi and Pardo; Assistant Professors Angelo, Bennett, Egea, and Iglesias.

101 (401) U 5
Elementary Spanish
Su, A, W, Sp. 5 cl.
May not be taken concur. with French 101-102, Port. 101-102, Ital. 101-102. Not open to students who are not eligible to take Engl. 101. Credit in 101 will be counted toward graduation only if followed by successful completion of 102, or if taken after successful completion of the fourth regular university course in another foreign language.
Elements of Spanish grammar, with oral and written exercises; attention to ear training and oral practice; elementary reading based on Spanish geography, history, and customs.

102 (402) U 5
Elementary Spanish
Su, A, W, Sp. 5 cl.
Prereq.: 101.
May not be taken concur. with French 101-102, Ital. 101-102, Port. 101-102.
The elements of Spanish grammar with abundant oral and written exercises; development of conversational skill; reading vocabulary building, attention to Spanish idioms.

103 (403) U 5
Intermediate Spanish
Su, A, W, Sp. 5 cl.
Prereq.: 102.
Continuation of Spanish grammar, attention to idioms; reading of short stories, plays, and novels.

104 (404) U 5
Intermediate Spanish
Su, A, W, Sp. 5 cl.
Prereq.: 103 or 112.
Reading of Spanish plays, short stories, and novels; emphasis on oral practice and Spanish idioms.

105 (410) U 5
Elementary Spanish Conversation and Composition
Su, A, W, Sp. 5 cl.
Prereq.: 104.
Course conducted in Span.
Intensive practice in oral and written Spanish, based on texts and periodicals concerned with contemporary Spain and Spanish America; grammar and idiom review.
112 U 5, 10, 15
Intensive Spanish
Su. 15 cl. Enrollment limited to 25 students.
Full time of student and full fees required.
Prereq.: Permission of dept. chairman.
Equiv. of 101, 102, and 103.
Students with credit for 101 or the equiv. may not register for more than 10 cr. hrs. Students with credit for 101 or 102 or the equiv. may not register for more than 5 cr. hrs. Students with credit for 103 or the equiv. may not register for credit.
Elementary and intermediate Spanish; intensive drill in forms, syntax, vocabulary, and idiom; reading of short stories and plays in Spanish.

162 (415) U 5
Elementary-Intermediate Spanish for Selected Students
W. 5 cl.
Prereq.: Grade of A in 101 and permission of dept. Successful completion of 101-162-163 fulfills language requirements and satisfies prereq. for 400-level courses.
Angelo.

163 (416) U 5
Elementary-Intermediate Spanish for Selected Students
Sp. 5 cl.
Prereq.: 162.
Successful completion of 101-162-163 fulfills language requirements and satisfies prereq. for 400-level courses.
Continuation of 162.

271 (570) U 5
Spanish Literature in English Translation
W. 5 cl.
Not open to Span. majors.
Selection of major works in Spanish literature in English translation from the early Renaissance period to the present.

401 (518) U 3
Review Grammar and Composition
Su, A, W, Sp. 3 cl.
Prereq.: 105.
Review of Spanish grammar; composition on assigned topics and practice in translation.

402 (521) U 3
Intermediate Spanish Conversation and Composition
A, Sp. 3 cl.
Prereq.: 105.
Vocabulary building, practice in speaking Spanish, conversation and composition dealing with aspects of Spanish life.

403 (522) U 3
Intermediate Spanish Conversation and Composition
Su (1st term), W. 3 cl.
Prereq.: 105.
Vocabulary building, practice in speaking Spanish, conversation and composition dealing with aspects of Spanish and Spanish American life.

404 (519) U 5
Spanish Pronunciation
Su, A, W, Sp. 5 cl.
Prereq.: 105.
Abundant practice with corrective exercises; some attention to problems of teaching pronunciation.

421 (517) U 5
Introduction to Modern Spanish Literature
Su, A, W, Sp. 5 cl.
Prereq.: 104.
Spanish literature and literary movements of the 19th and 20th centuries and their relation to modern Spain.

422 (531) U 5
Spanish Literature: Middle Ages through Golden Age
A, W, Sp. 5 cl.
Prereq.: 421.
Reading and discussion of the principal works in Spanish literature from the Cid through the Golden Age.

423 (532) U 5
Introduction to Modern Spanish-American Literature
A, W, Sp. 5 cl.
Prereq.: 421.
Selections from Spanish-American literature of the late 19th and 20th centuries.

571 G 5
Basic Spanish for Graduate Students
A. 5 cl.
Prereq.: Grad. standing.
Credit does not apply to the minimum number of hours required for the master's or doctoral degree. No audit.
Designed primarily for students who have no formal preparation in Spanish, covering basic grammar and vocabulary.

572 G 3
Spanish for Research I
W. 3 cl.
Prereq.: Grade of C or above in 571, or equiv.
preparation demonstrated by a placement test.
Credit does not apply to the minimum number of hours required for the master's or doctoral degree. No audit.
Repeatable twice.
Satisfactory completion of this course (grade of A or B) will be accepted as evidence of a dictionary reading knowledge in fulfillment of Ph.D. language requirement.

573 G 3
Spanish for Research II
Sp. 3 cl.
Prereq.: Grade of A or B in 572, or equiv.
preparation demonstrated by a placement test.
Credit does not apply to the minimum number of hours required for the master's or doctoral degree. No audit.
Repeatable twice.
Satisfactory completion of this course (grade of A or B) will be accepted as evidence of a thorough reading knowledge in fulfillment of Ph.D language requirement.
605 Advanced Composition and Conversation
Su (2nd term), A, W, Sp. 3 cl.
Prereq.: 401 and 402 or 403.
Conducted in Spanish. History, customs, and manners of Spain and Spanish America. Iglesias.

607 Modern Spanish Syntax
Su, A, W, Sp. 5 cl.
Prereq.: 421, 401, and 402 or 403.
Systematic study of Spanish grammar with composition and other exercises based on contemporary authors; modern tendencies in syntactic analysis. Angelo and Egea.

608 Spanish Translating
W. 3 cl.
Prereq.: 607 or equiv.
Translation from Spanish to English and from English to Spanish.

609 Spanish Phonetics
A, W, Sp. 4 cl.; 1 hr. lab.
Prereq.: 421 or 401, 404, and 402 or 403.
A detailed analysis of the phonological structure of Spanish and a comparative comparison with English; practical problems of pronunciation and of teaching are stressed. Babcock, Iglesias, and Pardo.

610 The Contrastive Structures of Spanish and English
A. 5 cl.
Prereq.: 401, 402 or 403, 404, and 421.
Phonetics, phonemics, morphology, and syntax of Spanish contrasted with English. Egea.

612 Study Tour of Hispanic America
Sp.
Prereq.: Minimum of 25 cr., hrs. in Span. and permission of dept. chairman.
Not open for grad. credit to majors in Span.
The first five weeks will be devoted to intensive study of Spanish on this University campus; the remainder of the course will be spent in travel in South America; while traveling, formal language instruction will be given by the tour leader; in South America, only Spanish will be spoken.

620 Main Currents in the Development of Spanish Literature
Sp. 5 cl.
Prereq.: 10 cr. hrs. of Span. literature at the 400 level or permission of instructor.
Not for grad. credit for majors in Span.
Spanish literature from the Middle Ages to the present with emphasis on the evolution of major movements. Bennett.

621 (614) Cervantes
A. 4 or 5 cl.
Prereq.: 421, and 422 or 423.
An intensive study of Don Quixote. Levitzki.

622* (631) Romanticism in the Hispanic World
W. 3 cl.
Prereq.: 421, and 422 or 423.
A study of dramatists, poets, novelists, and essayists designed to bring out the literary unity of the Hispanic world in the Romantic period. Froshch.

623* (607) The Spanish Novel of the 19th Century
Su. 4 or 5 cl.
Prereq.: 421, and 422 or 423.
A study of the development of the modern Spanish novel with particular attention to the works of Perez Galdos. Griffin.

624* (608) Contemporary Spanish Fiction
Sp. 3 cl.
Prereq.: 421, and 422 or 423.
A survey of European drama at the beginning of the century and a detailed study of the Spanish dramatists from Benavente to Alfonso Sastre. Froshch.

625* (610) Modern Drama
A. 3 cl.
Prereq.: 421, and 422 or 423.
A survey of European drama at the beginning of the century and a detailed study of the Spanish dramatists from Benavente to Alfonso Sastre. Froshch.

626* (637) Spanish American Literature Through Romanticism
A. 5 cl.
Prereq.: 10 cr. hrs. in Span. literature at the 400 level.
A study of the chronicles and main trends in colonial Spanish American literature; works of the Inca Garcilaso, Sor Juana and Alarcon will be included. Bennett.

627* (538) Spanish American Literature Since Romanticism
W. 5 cl.
Prereq.: 10 cr. hrs. in Span. literature at the 400 level.
The advent of 'americanismo literario'; a study of the romantics and the schools that followed up to 'modernismo.' Bennett.

628 (639) Contemporary Spanish American Fiction
Sp. 3 cl.
Prereq.: 421, and 422 or 423.
The development of narrative prose in Spanish American from the second World War to the present. Froshch.
629* (640) U G 3
The Generation of 1898
Sp. 3 cr.
Prereq.: 421, and 422 or 423.
Readings in fiction, poetry, and the essay from such authors as Unamuno, Ozolin, Valle-Inclán, Barojas, A. Machado, and J. R. Jimenez. Babcock.

630† (641) U G 5
Contemporary Hispanic Poetry
W. 5 cr.
Prereq.: 421, and 422 or 423.
Currents of Spanish and Spanish American poetry from Ruben Dario to the present time. Frosch.

631* (645) U G 2-5
Spanish Literature
Su. 5 cr.
Prereq.: 421, and 422 or 423.
Repeatable to a maximum of 15 cr. hrs.

632† U G 3
Early Spanish American Fiction
W. 3 cr.
Prereq.: 421, and 422 or 423.
The origin and development of the Spanish American novel to the 1930's. Frosch.

694 U G 1-15
Group Studies in Spanish
Prereq.: Permission of instructor.
Repeatable to a maximum of 30 cr. hrs.

721† (611) U G 5
Drama of the 16th and 17th Centuries
Sp. 5 cr.
Prereq.: 421, and 422 or 423.
An intensive study of a limited number of plays of the representative dramatists of the 16th and 17th centuries. Levisi.

722† (612) U G 5
Poetry of the 16th and 17th Centuries
W. 5 cr.
Prereq.: 10 cr. hrs. in Span. literature at the 400 level.
Major poets and movements of the 16th and 17th centuries. Levisi.

723* (613) U G 5
Prose of the 16th and 17th Centuries
W. 4 or 5 cr.
Prereq.: 421, and 422 or 423.
Selected prose works by major Renaissance and Baroque authors. Levisi.

H783 (705) U 3-5
Honors Course in Spanish
Conference, library or phonetics laboratory arr.
Prereq.: 4th yr. standing with a report of A in at least half of the Span. courses and an average of B in the remainder, and permission of dept. and the Honors Committee of the College.
Repeatable to a maximum of 15 cr. hrs.
This course offers undergraduates with special aptitudes a greater opportunity to do independent study than is possible in the ordinary course.

811 (729) G 3
History of the Spanish Language
A. 3 cr.
Prereq.: M.A. candidacy or permission of instructor.
Basic concepts of historical linguistics; the major factors of change in the history of the Spanish language from Roman times to the present. Griffin.

812 (805) G 3
Old Spanish I
W. 3 cr.
Prereq.: Knowledge of Latin.
The development of Old Spanish phonology and morphology with an introduction to the reading of Old Spanish texts. Griffin.

813 (806) G 3
Old Spanish II
Sp. 3 cr.
Prereq.: 812.
A continuation of Old Spanish I, with attention to syntax, vocabulary, and dialectology. Griffin.

814* G 5
The Structure of the Spanish Language
A. 5 cr.
Prereq.: 610 or permission of instructor.
Examination of the structure of Spanish; the contributions of statistics, computers and generative (transformational) grammar to the study of language. Egea.

815* G 3-5
Spanish Language in America
W.
Prereq.: 620 or permission of instructor.
A linguistic approach to the theoretical and practical problems of Spanish-American dialectology. Egea.

820 (730) G 3
Introduction to Medieval Literature
W. 3 cr.
Prereq.: M.A. candidacy or permission of instructor.
Selected readings in Spanish poetry and prose from the beginning to the end of the 16th century, partly in modernized versions. Pardo.

821 G 3
Old Spanish Literature
Sp.
A literary approach to medieval poetry and prose. Pardo.
Topics and Problems in Spanish Literature: Golden Age
A, Sp. 3 cl.
Prereq.: 20 cr. hrs. of Span. literature at the grad. level. Qualified M.A. candidates may register with permission of instructor.
Intensive exploration of a special topic or problem. Babcock and Pardo.

Topics and Problems in Spanish Literature: 19th Century
W, 3 cl.
Prereq.: 20 cr. hrs. of Span. literature at the grad. level. Qualified M.A. candidates may register with permission of instructor.
Intensive exploration of a special topic or problem. Babcock.

Topics and Problems in Spanish Literature: 20th Century
W, 3 cl.
Prereq.: 20 cr. hrs. of Span. literature at the grad. level. Qualified M.A. candidates may register with permission of instructor.
Intensive exploration of a special topic or problem. Babcock.

Topics and Problems in Spanish Literature: Spanish American Literature
Sp., 3 cl.
Prereq.: 20 cr. hrs. of Span. literature at the grad. level. Qualified M.A. candidates may register with permission of instructor.
Intensive exploration of a special topic or problem. Frosch.

Seminar in Spanish Literature
Su (1st term), A.
Prereq.: Permission of instructor. Pardo.

Seminar in Spanish Literature
Su (2nd term), W.
Prereq.: Permission of instructor. Levi.

Seminar in Spanish Literature
Sp.
Prereq.: Permission of instructor. Frosch.

Introduction to Methods in the History and Criticism of Literature
A, 5 cl.
Selected readings in basic literary history, criticism, and theory, with practice in the use of standard bibliographical aids to scholarship. Levi.

Bibliography and Method
Sp.
Introduction to problems, tools, and methods of linguistic and literary research.

Medieval and Renaissance Culture
(See Medieval and Renaissance Studies 888.)

Medieval and Renaissance Literature
(See Medieval and Renaissance Studies 899.)

Individual Studies in Spanish
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.

Group Studies in Spanish
Prereq.: Permission of instructor.
Repeatable to a maximum of 30 cr. hrs.
Investigation of minor problems in the various fields of Spanish literature and language.

Research in Spanish Language or Literature
Research for thesis purposes only.

Speech
Office: 205 Derby Hall, 154 North Oval Drive
Professors Brooks (Chairman), Abernathy (Adjunct), Berquist, Black (Regents), Douglas, Emery, Fotheringham, Golden, Hull, Irwin, Knower, Lewis, Mall, Moser (Emeritus), Summers (Emeritus), Wagner, Wiley (Emeritus), and Yeager (Emeritus); Associate Professors Brittin, Elwing, Goff, Grim, Grub, Monaghan, Rieke, Riley, Sands, and Schoen; Assistant Professors Blunt, Brunt, Faylor, Harrison, Irwin, Melnik, Nilo, Perozzi, Reynolds, Steil, and Wilcox.

American Speech for International Students
A, 5 cl.
5 cr. hrs. will be added to graduation requirements. Often taken in conjunction with Engi. 071.
Assignment to both English and the appropriate Speech course is made on the basis of examinations given at the beginning of each quarter to all new students whose native language is not English. Goff. Fee.
040  (410)  U 0 or 3
Personal Speech and Hearing Rehabilitation
Su, A, W, Sp.  5 cl.
Credit shall not count toward graduation.
For students with speech or hearing disorders.
Repeatable.
Personal speech and hearing rehabilitation for
individuals with articulation, voice, or stuttering
problems of speech or with impaired hearing. Baxter.

105  (401)  U 5
Principles of Effective Speaking
Su, A, W, Sp.  5 cl.
The principles of effective speaking; preparation and
presentation of informative and persuasive speeches;
the speech processes with emphasis on speech as a

110  (402)  U 5
Group Discussion
Su, A, W, Sp.  5 cl.
Designed to develop the attitudes, skills, and knowledge
of methods favorable to effective participation in
discussion by conferences, committees, and other small
groups. Harrison.

115  (425)  U 3
Broadcasting in America
Su, A, W, Sp.  3 cl.
The development and structure of broadcasting to
stimulate critical appreciation and understanding of
the role and influence of television and radio in

120  (509)  U 3
Training the Speaking Voice
A, W, Sp.  3 cl.
Not open to students with credit for 135.
Study and application of principles basic to the
development of above-average skills for public
speaking, acting, oral interpretation, and broadcasting
activities. Riley.

125  (511)  U 3
Parliamentary Law
A, W, Sp.  3 cl.
Study of the rules of procedure by which self-governing
organizations transact business. Lawson.

135  (417)  U 3
Voice and Diction
Su, A, W, Sp.  3 cl.
Not open to students with credit for 120.
Introductory study of the principles of a satisfactory
speaking voice; designed for the student concerned
about the adequacy of his speech. Goff.

201  (416)  U 5
Introduction to Speech
A, W, Sp.  5 cl.
Designed for students who wish to have a broad
overview and understanding of the field of speech.
Brooks.

205  (A)  U 1
Communication Co-Curricular Activities
Each category repeatable to a maximum of 6 cr. hrs.
Prereq.: Permission of instructor.
Participation in specialized activities.
  a. Communication Laboratory Projects, Knower.
  b. Forensics, Stanton.
  c. Oral Interpretation, Brooks.
  d. Television and Radio Broadcasting, Steis.

209  U 3
Communication Theories and Models
A, W, Sp.  3 cl.
Communication model characteristics; structure and
function, general principles; basic processes and major
types of activities; receivers and effects; motivations,
value systems, and norms. Knower.

213  U 5
Rhetoric in Western Thought
W, Sp.  5 cl.
Rhetorical theories as they reflected and affected
society from Greece to modern times; relations to logic,
ethics and poetics; the classical tradition versus
sophistical concepts. Golden.

217  (502)  U 5
Rhetoric of American Issues
A, W.  5 cl.
A study of selected American orators, their speeches,
and the audience reactions on significant issues during
1830-1962. Berquist and Harrison.

221  (505)  U 5
Fundamentals of Oral Interpretation
Su, A, W, Sp.  5 cl.
Introductory course to develop understanding and
appreciation of literature through the oral re-creation
of literary materials and critical listening. Brooks.

225  (506)  U 5
Persuasive Communication
A, W, Sp.  5 cl.
Analysis of persuasive communication as a form of
influence; the process and functions involved, its
potential and limitation for individuals and
organizations. Reike.

229  (560)  U 3
Television and Radio Performance
A, W, Sp.  3 cl.
Role, function, and responsibilities of the performer in
television and radio; non-dramatic and dramatic
performance before the microphone and camera;
critical evaluation. Foley.

235  (504)  U 3
Speech Functions and Responsibilities
of the Teacher
A, W, Sp.  3 cl.
A study of speech and hearing deviations commonly
found in the classroom and of the role of the teacher.
Brittin.
240  (580)  U 3  
Bases of Oral Communication  
A, Sp.  3 cl.  
A study of the theories of the production and perception of speech. Grubb.  

250  (590)  U 3  
The Development of Speech and Language in Children  
W, Sp.  3 cl.  
The growth of speech and language in children; theories of speech and language development; causes of speech and language aberrations. Goff.  

305  (470)  U 5  
Argumentation and Debate  
Su, A, W, Sp.  5 cl.  
Principles of reasoned discourse and their application to controversial issues. Golden and Stanton.  

315  U 3  
Informative Communication  
A, W.  3 cl.  
Analysis of potentials and limitations of informative communications for individuals and groups as communicatees or communicators; processes and functions of informative communications in diverse situations. Berquist.  

325  U 3  
Freedom and Responsibility in Communications  
A, W, Sp.  3 cl.  
Freedom, interdependence, and responsibility in communication: history and analysis of dominant trends, theories, and actions. Emery.  

330  U 3  
The Rhetoric of Negro-Americans  
W.  3 cl.  
Examination of the rhetoric of Negro-American in connection with such strategies as non-violence, black power, legal action, etc., to establish a role or identity in American society. Rieke.  

410  U 4  
Program Processes in Radio  
A, W.  3 cl.  
The program functions in radio communication including the planning, production, and direction of programs. Steir.  

420  U 3  
Symbol Systems and Communication Behavior  
Sp.  3 cl.  
Study of the nature and forms of symbolic behavior; the human uses of symbols, particularly in communication. Fotheringham.  

440  (677)  U 5  
Anatomy and Physiology of the Ear and Vocal Mechanisms  
A, Sp.  5 cl.  
Prereq.: 240.  
A study of the organs and systems of the body related to the processes of speech and hearing. Fee.  

505  (601)  U G 5  
Forms of Public Address  
Su, 5 cl.  
The organization, style, and delivery of speeches for special occasions. Berquist.  

510  U G 5  
Program Processes in Television  
Su, A, W.  5 cl.  
Creating, planning, producing, and directing of the television program; development of program forms, program sources, programming organization, and program evaluation. Foley and Lowe. Fee.  

Tests and Measurements in Speech  
(See Psychol. 512.)  

515  U G 3  
Organizational Communication  
Sp.  3 cl.  
A study of the communicator and communication systems in organizations with emphasis on theory, relationships, and objectives. Brooks.  

520  U G 3  
Communication and Social Behavior  
Sp.  3 cl.  
Communication processes underlying social and cultural pressures on the individual; communication analysis of behavior; techniques of inquiry into forms of symbolic influence. Monaghan.  

525  U G 4  
Broadcasting and Written Messages  
A, Sp.  3 cl.  
Not open to students with credit for (654) and (764).  
Analysis of program types in relation to writing effectiveness; communication significance of content and style elements in television and radio. Monaghan.  

540  (682)  U G 5  
Introduction to Audiology  
Su, A, Sp.  5 cl.  
Prereq.: 240; concur. 440.  
The study of hearing, both normal and abnormal, with information on the nature, causes, identification, and rehabilitative treatment of persons with hearing disorders. Brunt. Fee.  

545  (585)  U G 3  
Principles of Phonetics  
A, W.  3 cl.  
Prereq.: 240 recommended.  
The available descriptions of the sounds of speech and a comparative study of the systems of representing the sounds. Grubb and Black.  

550  (694)  U G 3  
Introduction to Speech Pathology  
A.  3 cl.  
Prereq.: 240, 245, and 250.  
A study of disorders of speech; information on prevalence, causes, types, and effects.
The Teaching of Speech in Secondary Schools
(See Ed. 556.)

611 U G 3
Advanced Oral Interpretation
Sp. 3 cl.
Prereq.: 221 or grad. standing.
A study of programming non-dramatic literature for
communications by groups; novel, short story, and
verse stressed; laboratory experiences in Readers
Theatre and Chamber Theatre. Harrison.

616 U G 5
Communication in Decision-Making
A. 5 cl.
Not open to students with credit for (610) and (611).
Discussion and debate as critical instruments of social
decisions; critical analysis and social influence in
committee, conference, negotiation, and debate. Rieke.

621 U G 5
Theories of Rhetoric
A. 5 cl.
Not open to students with credit for (610) and (621).
Reading and detailed study of the theories of principal
rhetoricians from ancient to modern times. Golden.

626 U G 5
Broadcast Audience Analysis
Su, A, W. 4 cl.
The role of the audience in broadcasting; listener
characteristics and preference in relation to program
selection and program purposes. Monaghan.

Teaching Dramatics and Oral Interpretation
in Secondary Schools
(See Ed. 631.)

632 (683) U G 3
Visual Communication:
Theories of Speech Reading
A, Sp. 3 cl., 2 1-hr. labs.
Prereq.: 540.
Study of the major theories and procedures for teaching
visual communication. Wilcox.

The Psychology of the Audience
(See Psychol. 633.)

636 (688) U G 3
Principles of Audiometry
Su, W, Sp. 3 cl.
Prereq.: 540.
A study of the techniques of hearing assessment in
clinical, educational, industrial, and medical settings.
Brunt.

640 (695) U G 5
Speech Pathology: Disorders Associated
with Physical Anomalies
Su, W. 5 cl.
Prereq.: 440 and 550.
Consideration of theories, principles, and procedures
for appraisal and treatment of deviant voice and
articulation that accompanies cleft palate, cerebral
palsy, maxillofacial injuries, and other physical
disabilities. Fee.

644 (689) U G 3
Theories of Language Development of the Deaf
A. 3 cl.
Prereq.: 250 and Psychol. 370.
Study of the communicative processes of acoustically
handicapped individuals: symbolization, meaning,
syntax. Wilcox.

648† (690) U G 3
The Pre-School Deaf Child
Su. 3 cl.
Prereq.: 250, Ed. 659, and 660.
Study of the problems of communication of the deaf
child.

652 (696) U G 5
Stuttering: Theories and Therapies
Sp. 5 cl.
Prereq.: 556 and 10 cr. hrs. in Psychol.
Theories, principles, and procedures for the appraisal
and treatment of persons with dysfluencies in speech.
Irwin. Fee.

656 (697) U G 5
Principles and Procedures for Appraisal
and Treatment in Speech Pathology
Su, W. 5 cl.
Prereq.: 135 and 550.
Principles and procedures in the appraisal and
treatment of speech disorders with emphasis on vocal
and articulatory deviations not associated with physical
disabilities. Irwin. Fee.

Behavioral Aspects of Language Disabilities
(See Ed. 663.)

The Psychology of Speech
(See Psychol. 670.)

693 (700) U G 1-5
Individual Studies in Speech
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Conference, library, and laboratory work.

705 U G 3
Principles of Rhetorical Criticism
W. 3 cl.
Not open to students with credit for (623) and (624).
Principles, functions, and methods of rhetorical
criticism as it relates to public address. Harrison.

715 U G 3
Broadcasting and the Public Interest
Sp. 3 cl.
Communication significance of "public interest"
concept in broadcasting; effect on program standards,
self-regulation, government regulation. Emery.
Creative Television Production and Direction
Su., 8 cl., 1 3-hr. lab.
Prereq.: Permission of instructor.
Repeatable to a maximum of 6 cr. hrs.
Advanced theories of television production and direction; evaluation of program forms; creation and production of experimental programs under broadcast conditions. Foley and Lowes.

Hearing Aids and Auditory Training
W., 3 cl.
Prereq.: 540 and 636.
Operational principles of individual and group amplification systems for those with hearing impairments. Wilcox.

Theories of Speech Development of the Deaf
W., 3 cl.
Prereq.: 240, 245, and 644.
Study of the development of speech under conditions of minimum auditory stimulation and acoustic feedback. Wilcox.

Beginning Practicum in Speech and Hearing
Su., A, W, Sp., 2 cl., 7 1-hr. labs.
Prereq.: Permission of instructor.
Repeatable to a maximum of 12 cr. hrs.
Supervised practice in appraisal and treatment.
- Speech Pathology
- Vocal and articulatory disorders
- Audiology
- Hearing disabilities
- Language Disorders in Children
- Language disabilities of children
Goff and Wilcox.

Teaching of American Speech to Speakers of Other Languages I
W., 3 cl., 2 lab. hrs.
Concur.: Engil. 777.
Approaches to teaching American speech and special study of the perception and motor production of the acoustic patterns of English (TESOL Program). Goff.

Teaching of American Speech to Speakers of Other Languages II
Sp., 1 cl., 4 lab. hrs.
Prereq.: 777; concur. Engil. 778.
Techniques for improving listening and speaking skills of speakers of other languages learning American English; development of materials and use of audio laboratories (TESOL Program) Goff.

Honor Course
Prereq.: 6th yr. standing; with a grade of A in at least half of the Speech courses and an average of B in the remainder; permission of the instructor under whose supervision the work is to be completed and the Honors Committee of the College.
Repeatable to a maximum of 15 cr. hrs.
A program of independent study for the student with special aptitudes; individual conferences and reports.

Group Studies in Speech
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

Aesthetics of Broadcast Communication
W., 3 cl.
Aesthetic and creative processes in program evaluation; theories of response to artistic elements of style, content, and treatment. Foley.

Advanced Studies in Television and Radio
W, Sp.
Repeatable to a maximum of 20 cr. hrs.
- The Broadcast Media: Educational and Cultural Media. W. Emery

Seminar in History and Criticism of Public Address
Repeatable to a maximum of 40 cr. hrs.
- Rhetorical Campaigns of the Oppressed. W. Rieke

Seminar in Rhetorical Theory
Repeatable to a maximum of 15 cr. hrs.
- Classical Rhetoric. A. Berquist.
Seminar in Television and Radio
Su, A. W. Sp.
Repeatable to a maximum of 40 cr. hrs.
- The History of Broadcasting. Su (1st term).
- Pressure Groups and Broadcasting. Sp. Foley.

Seminars in Communication Behavior
Repeatable to a maximum of 40 cr. hrs.
- Non-Verbal Symbolism. Su (1st term).
- Contemporary Persuasion Theory. Su (2nd term).
- Communication Theories and Models. Su (2nd term).
- Contemporary Trends in Oral Interpretation. A. Schoen.
- Computer Applications in the Study of Communications. A. Foley.
- Oral Interpretation as Critical Commentary. Sp. Lewis.

Experimental Phonetics
Sp. 3 cl., 2 2-hr. labs.
Prereq.: 245, 856, or permission of instructor.
A study of experimental investigations of acoustic, physiological, and psychological aspects of speech and related laboratory experiments. Black. Fee.

Disorders of Communication Associated with Neuropathologies
Su. 5 cl.
Study of the nature, diagnosis, prognosis, and treatment of speech manifestation in dysarthria and aphasia. Fee.

Curricular and Instructional Adjustment for the Deaf Child
Sp. 3 cl.
Prereq.: 648 and Ed. 735.
Laboratory projects directed toward the development of language, silent reading, lip-reading among deaf children. Wilcox.

Advanced Practicum in Speech and Hearing
Su, A, W, Sp. 1 cl., 3 clinical hrs. for each hour of credit per week.
Each subdivision repeatable to a maximum of 15 cr. hrs.
Each subdivision for any specific disorder must be preceded by or taken concurrently with didactic study of evaluative and therapeutic procedures appropriate to the disorder. Fee.

Speech Pathology
Prereq.: 755a and 632.
Speakers, and when appropriate 640, 836, and 844.03 or permission of instructor.
Speech disorder associated with structural disorders, or with neuropathologies, stuttering, articulation, voice, and foreign accent.

Audiology
Prereq.: 755b and 632.
Aural rehabilitation, diagnostic audiometry, speech-reading, and auditory training of the acoustically impaired individual.

Language
Prereq.: 250 and 755a.
Language disorders in children, including aphasia and deafness.

Interdisciplinary Functioning in Disorders of Oral Communication
W. 4 cl.
Prereq.: 610, 836, and 844.
The diagnosis and treatment of profound speech and hearing disorders and the joint rehabilitation treatment accorded pathological ear and vocal mechanisms by ancillary disciplines. Grimm.

Advanced Study of American Phonetics
A. 3 cl., 2 2-hr. labs.
Prereq.: 245.
Comparative phonetics, dialects and other variations of American speech; lecture, field work, and spectrography. Grubb. Fee.

Speech and Hearing
W. 5 cl.
Prereq.: 540 or equiv, and Physics 501.
Theoretical concepts and physiological and psychophysical data relative to hearing with particular reference to the perception of speech. Black. Fee.

Seminars in Education
(See Ed. 255.255.)

Interdepartmental Seminar
Sp.
(See Interdepartmental Seminars.)
940  G 3-5
Advanced Studies in Speech
and Hearing Science
Repeatable to a maximum of 45 cr. hrs.
Fee.
  a. The Design of Experiments in Speech and
     Hearing. A. Black.
  b. Communication Problems of the Mentally
     Retarded. A. Perozzi.
  c. Instrumentation for Speech and Hearing. W.
     Grubb.
  e. Advanced Audiometry. W. Brunet.
  f. Disorders of Voice. A.
  g. Studies in Vocalizing of Infants. Goff.
  h. Cerebral Palsy.

950  (890)  G 1-5
Seminar in Speech and Hearing Science
Repeatable to a maximum of 45 cr. hrs.
Fee.
  a. Basic Areas of Speech Pathology and Audiology:
  c. Speech Pathology: Management and Supervision.
     A. Goff.
  d. Pediatric Audiology and Central Auditory
     Dysfunction. A. Brunet.
  e. Supervision and Direction of Programs in Speech
     Pathology. Irwin.
  f. Speech Pathology: Therapy Procedures with
  g. Basic Areas of Speech Pathology and Audiology:
     Information Theory as Related to Speech and
     Hearing. Black.
  h. Speech Pathology: Psychological Disorders of
     Speech. W. Irwin.
    i. Basic Areas of Speech Pathology and Audiology:
       Phonetics and Phonemics. Grubb.
    j. Basic Areas of Speech Pathology and Audiology:
    k. Speech Pathology: Laryngectomy. W.
    l. Speech Pathology: Counseling. Irwin.
    m. Speech Pathology: Appraisal and Diagnosis. Su.
       Irwin.

990  (705)  G 3
Areas and Techniques of Research in Speech
Su, A. 3 cr.
Prereq.: 25 cr. hrs. in Speech.
A review and critical commentary on typical methods
of research in each of the principal areas of graduate
research in speech; research reports. Knowler.

994  G 3-5
Group Studies in Speech
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

999  (950)  G Arr.
Research in Speech
Research for thesis or dissertation purposes only.

Statistics

Office: 112 Mathematics Building, 231 W. 18th Avenue

Professors Rustagi and Whitney; Associate Professors
Srivasvata and Wilkie; Assistant Professors Aliaire,
Anderson, Barron, and Singh.

125  U 5
Elementary Mathematical Statistics
Sp. 5 cr.
Prereq.: Math. 116 or 150.
Not open to students with credit for Math. 245 or (435).
Elementary principles of probability and introduction to
the use of the binomial and normal distributions.

421  U 3
Introduction to Statistics
W. 2 cr., 1 2-hr. lab.
Prereq.: Math. 254 or (538) or permission of chairman.
Not open to students with credit for Math. 421 or (946).
Combinatorial probability, fundamental concepts of
probability distributions, sample statistics, estimation
and testing hypotheses, roots of statistical theory.

425  U 5
Probability and Statistics I
A. W. 4 cr., 1 lab. hr.
Prereq.: Math. 254 or permission of chairman.
Not open to students with credit for Math. 425.
Elements of discrete and continuous probability;
introduction to estimation and testing of hypotheses.

426  U 5
Probability and Statistics II
W. Sp. 4 cr., 1 lab. hr.
Prereq.: 425 or Math. 425.
Not open to students with credit for Math. 426.
Continuation of 425.

518  U G 3
Statistical Theory in Medical Research I
A. 3 cr.
Prereq.: Permission of instructor, special grad.
students in medical sciences.
Not open to students with credit for Math. 528.
Fundamental concepts of probability, random
variables, statistical inference, regression and
correlation analysis; topics selected from biostatistics,
life tables techniques, computers in medicine.

519  U G 3
Statistical Theory in Medical Research II
W. 3 cr.
Prereq.: 518 or Math. 528.
Not open to students with credit for Math. 529.
Continuation of 518.
520  U G 5
Mathematical Statistics I
Su, A. W.  5 cl.
Prereq.: Math. 254 or (538) or permission of chairman.
Not open to students with credit for Math. 520 or (672).
Permutations, combinations, probability; discrete and
continuous distributions; Binomial, Poisson, normal
chi-square, t, F distributions; limit theorems of
probability.

521  U G 5
Mathematical Statistics II
Su, W, Sp.  5 cl.
Prereq.: 520 or Math. 520.
Not open to students with credit for Math. 521 or (673).
Testing simple hypotheses; applications of t test,
chi-square tests, F tests, nonparametric tests;
confidence intervals.

532  U G 3
Discrete Probability
A, Sp.  3 cl.
Prereq.: 520 or Math. 520.
Not open to students with credit for Math. 522 or (674).
Discrete probability spaces, random walk, Markov
chains, stochastic processes, strong laws of
probability.

593  U G 2-5
Individual Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

594  U G 2-5
Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

600  U G 1-5
Statistics Laboratory
Prereq.: Permission of instructor.
Experience is given the student in working with real
data through association with current projects in the
Statistics Laboratory.

632  U G 3
Applied Stochastic Processes
Sp.  3 cl.
Prereq.: 520 or Math. 520.
Not open to students with credit for Math. 620.
Normal processes and covariance stationary
processes, counting processes and Poisson processes,
renewal processes.

635  U G 3
Statistical Analysis of Time Series
Sp.
Prereq.: 521 or Math. 521 or permission of instructor.
Time series models; estimation of the spectral density
function; transformations of time series; prediction
theory, applications.

641  U G 3
Mathematical Statistics III
A, Sp.  3 cl.
Prereq.: 521 or Math. 521.
Not open to students with credit for Math. 621.
Continuation of 520, 521, covering topics from
regression analysis and analysis of variance, i.e.,
linear models.

651  U G 3
Survey and Sampling Theory
Su, Sp.  3 cl.
Prereq.: 641 or Math. 621 or permission of instructor.
Not open to students with credit for Math. 622.
Sampling from finite populations, multistage sampling,
stratification, regression and ratio estimates,
non-sampling errors, applications to large scale
sample surveys.

693  U G 1-5
Individual Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.
Individual conferences, assigned readings, and
reports on minor investigations.

694  U G 2-5
Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.
Designed to give groups of students an opportunity
to pursue special studies not otherwise offered.

725†  U G 3
Sequential Procedures in Statistics
W.  3 cl.
Prereq.: 521 or Math. 521, and Math. 550.
Not open to students with credit for Math. 725.
Sequential tests of hypotheses and their operating
characteristics, Wald’s SPRT tests, sequential
estimation, sequential designs and multiple decision
procedures.

742  U G 3
Analysis of Variance
A.  3 cl.
Prereq.: 521 or Math. 521, and Math 556, and 571.
Not open to students with credit for Math. 720.
General linear hypothesis, random components, mixed
models.

746  U G 3
Design and Analysis of Experiments
W.  3 cl.
Prereq.: 742 or Math. 720.
Not open to students with credit for Math. 721 or (733).
Experimental designs, efficiency, Latin squares,
balanced blocks, power functions, planned
experiments.
Multivariate Analysis I
A. 3 cr.
Prereq.: 521 or Math. 521, and Math. 571, and 551 or 653.
Not open to students with credit for Math. 726.
Multivariate normal distribution, Wishart distribution, Hotelling's T², multivariate theory of games, statistical games, and applications.

Multivariate Analysis II
W. 3 cr.
Prereq.: 755 or Math. 726.
Not open to students with credit for Math. 727.
Continuation of 755.

Order Statistics
A. 3 cr.
Prereq.: 521 or Math. 521, and 551 or 653.
Not open to students with credit for Math. 729.
Exact and asymptotic distributions and moments of order statistics, estimating parameters and testing hypotheses using order statistics, confidence intervals, and tolerance regions.

Nonparametric Statistics
W. 3 cr.
Prereq.: 761 or Math. 728.
Not open to students with credit for Math. 729.
Theory of testing hypotheses, single, double and k sample problems, rank orders, measures of correlation, and large sample properties.

Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

Statistical Inference I
W. 5 cr.
Prereq.: 521 or Math. 521, and Math. 722.
Not open to students with credit for Math. 824 or (734).
Classical and modern statistical inference from advanced point of view, estimation, principles of maximum likelihood, asymptotic theory, completeness, sufficiency and invariance.

Statistical Inference II
Sp. 3 cr.
Prereq.: 821 or Math. 824.
Not open to students with credit for Math. 825.

Statistical Decision Theory I
Sp. 3 cr.
Prereq.: 822 or Math. 825.
Not open to students with credit for Math. 826.

Introduction to the theory of games, statistical games, admissibility and completeness, complete class theorem, principles of sufficiency and invariance, sequential games.

Statistical Decision Theory II
Su. 3 cr.
Prereq.: 824 or Math. 826.
Not open to students with credit for Math. 827.
Continuation of 824.

Statistical Multiple Decision Procedures
Sp. 3 cr.
Prereq.: Permission of instructor.
Not open to students with credit for Math. 828.
Comparisons with a standard, the ranking of parameters different formulations, same multivariate and non-parametric problems of ranking and selection.

Advanced Design of Experiments
Sp.
Prereq.: 746 or Math. 721.
Not open to students with credit for Math. 822.
Partially balanced designs, factorial experiments, confounding and factorial replications, response surface designs.

Advanced Topics in Mathematical Statistics I
Su, Sp. 3 cr.
Prereq.: Permission of instructor.
Not open to students with credit for Math. 925 or (849).
Topics to be taken from the following: multivariate analysis, stochastic processes, analysis of variance, components of variance models, advanced test design.

Advanced Topics in Mathematical Statistics II
Su. 3 cr.
Prereq.: 881 or Math. 925.
Not open to students with credit for Math. 926 or (850).
Continuation of 881.

Research
Research for thesis or dissertation purposes only.
Surgery

UNCO: N-747 University Hospital, 410 West Tenth Avenue

Associate Professors Berggren, Boles, Cerilli, Endahl, Furste, Heydinger, Keith, Kirman, Meagher, Meckstroth, Morse, Sayers, B. Smith, Stoner, Taylor, Teitz and Yashon; Assistant Professors Arnold, Barnes, Bingham, Bonta, Cogbill, Coleman, Dornan, Duran, Eyring, Fusco, Harding, Hennessan, Ireton, Kirk, Lacey, Lewis, Miller, Minton, Nick, Pliechta, Puppel, Rausch, J. Roberts, Secrest, F. Smith, J. Smith, Stewart, Thornton, and Zox.

The Comprehensive Evaluation of the Patient
(See Med. 601, 602, and 603.)
[Instruction in the evaluation of the surgical aspect of patient care, as it relates to total care, by lectures, demonstrations, and bedside rounds.]

715 P 6 or 12
Clinical Surgery
Prereq.: Med. 3rd yr. standing. Must repeat to 12 cr. hrs.
The student serves as clinical clerk both in inpatient and outpatient departments on the General Surgical Services, with instruction in total patient care.

736 P 5, 6, or 11
Clinical Surgery
Prereq.: Med. 4th yr. standing; concur. Anes. 737 when registration is for 5 or 11 cr. hrs.
Must repeat to 11 cr. hrs.
Total inpatient and outpatient management of surgical disease; emergency room, orthopaedics, neurosurgery, thoracic surgery, plastic surgery, urology, and general surgery.

733 Individual Studies in Surgery
1, 2, 3, or 4 months.
Prereq.: Permission of instructor.
Repeatable to a maximum of 15 cr. hrs. for grad. credit.

733.02 General Surgery
P 6, 12
1 or 2 months; offered all months except June.
Repeatable to a maximum of 12 cr. hrs. for professional credit.

733.03 Neurological Surgery
P 6, 12, 18
1, 2, or 3 months; offered all months except June.
Repeatable to a maximum of 12 cr. hrs. for professional credit.

733.04 Orthopaedic Research
P 6, 12, 18
2, 3, or 4 months; offered all months.
Must repeat to a minimum of 12 cr. hrs. may repeat to a maximum of 24 cr. hrs. for professional credit.

794 Group Studies in Surgery
Prereq.: Med. 3rd or 4th yr. standing.

794.04 Emergency Room
P 6
1 month, offered all months except June.

794.05 Neurological Surgery
P 6, 12, 18
1, 2, or 3 months; offered all months except June.
Repeatable to a maximum of 18 cr. hrs.

794.06 Clinical Orthopaedics
P 6, 12, 18
1, 2, or 3 months; offered all months.
Repeatable to a maximum of 24 cr. hrs.

794.07 Pediatric Surgery
P 6
1 month, offered all months.

794.08 Plastic Surgery, Preceptorship
P 5 or 12
2 months, offered all months.
Must repeat to 12 cr. hrs.

794.09 Plastic Surgery
P 6, 12, 18
1, 2, or 3 months; offered all months except July and Oct.
Repeatable to a maximum of 18 cr. hrs.

794.10 Surgical Laboratory
P 6, 12, 18
University Hospitals or Children's Hospital, 1, 2 or 3 months; offered all months.
Repeatable to a maximum of 18 cr. hrs.

794.11 Thoracic Surgery
P 6
1 month, offered all months except June.

794.12 Thoracic Surgery-Cardiovascular
P 6
1 month, offered all months except June.

794.13 Urology
P 6
1 month, offered all months except June.

798 Internship in Surgery
Prereq.: Appointment as Intern, University Hospital.
Repeatable to a maximum of 72 cr. hrs.
Broad exposure to surgical principles and practices one-half general surgery, one-half surgical specialties; experience in operating rooms, wards, and emergency room; rounds, conferences.
Residency in Surgery
12 months full time, beginning July 1.
Prereq.: Appointment as Resident, University Hospital. Repeatable to a maximum of 360 cr. hrs.
Rotation through general surgery and surgical specialties rounds, and conferences.

Seminar in Surgery
Group and individual discussions of current surgical problems and their management; discussions of basic and applied topics. Zollinger and Staff.

Research in Surgery
Research for thesis purposes only.

Theatre
Office: 205 Derby Hall, 154 North Oval Drive
Professors Houkman (Chairman), Bowen, Lewis, and McDowell; Associate Professors Crepeau, Morrow, Ritter, and Schreck (Emeritus), Assistant Professors Glancy and Hastings. Instructors Ayers, Chappell, and Kirk.

Principles and Techniques of the Theatre Arts I
A. 1 2-hr. cl., 2 2-hr. labs.
Prereq.: Permission of Chairman.
Repeatable to a maximum of 6 cr. hrs.
Basic principles and elementary techniques of theatrical performance.

Principles and Techniques of the Theatre Arts II
W. 1 2-hr. cl., 2 2-hr. labs.
Prereq.: 101.
Continuation of 101.

Principles and Techniques of the Theatre Arts III
Sp. 1 2-hr. cl., 2 2-hr. labs.
Prereq.: 102.
Continuation of 102.

Introduction to Theatre
Su, A, W, Sp. 4 cl.
Not open to students with credit for Speech 165 or (430).
A study of the theatre with emphasis upon its cultural and social influences in our society. Fee.

Theatre Co-Curricular Activities
Prereq.: Written permission of instructor.
Repeatable to a maximum of 6 cr. hrs. including cr. hrs. in Speech (B) and Speech 265.
Hastings.

Stage Crafts
Su, A, W, Sp. 4 cl., 1 3-hr. lab.
Prereq.: 103.
Not open to students with credit for Speech 270 or (541).
Basic aspects of scenery construction, rigging, stage lighting, and sound effects, and their integration.
Cobes. Fee.

Art of the Theatre
Su, A, W, Sp. 3 cl.
Prereq.: 103.
Not open to students with credit for Speech 275.
Nature of theatre art; relationships between playwright, audience, actor, designer, and director; forms and styles of production.

Acting Fundamentals I
Su, A, W, Sp. 2 2-hr. cl.
Prereq.: 103 or permission of instructor.
Not open to students with credit for Speech 280 or (582).
The actor's resources and methods, basic body movement, and vocal interpretation.

Acting Fundamentals II
W, Sp. 2 2-hr. cl.
Prereq.: 280 or equiv.
Not open to students with credit for 365, Speech 365 or (522).
Scene study and development of technical acting skills.

Great Ages of the Theatre
A, Sp. 5 cl.
Not open to students with credit for Speech 285.
Concepts and characteristics of the great periods of the theatre of the Western World.

Stage Management
A. 2 cl., 1 lab. hr. arr.
Prereq.: 270 or equiv.
Research, discussion, and application of the principles of organizing and managing stage productions; experience in actual performance.

Drawing for Theatrical Production
A. 2 2-hr. labs.
Prereq.: 270 or equiv.
Execution and interpretation of specialized techniques of mechanical and perspective drawing for use in design, planning, and construction for the stage.
350 U 2
Introduction to Stage Make-up
A, Sp. 2 cl.
Practical application of the theories and techniques of theatrical make-up.

365 U 5
Stage Arts I
A, W, Sp. 2 2-hr. cl., 1 3-hr. lab.
Prereq.: 281.
Not open to students with credit for Speech 365 or 465.
Techniques of play analysis, interpretation, composition, movement, rhythm, and tempo; their integration in acting and direction.

366 U 5
Stage Arts II
A, W. 3 cl., 1 2-hr. lab.
Not open to students with credit for Speech 465.
Basic principles of stage pictoral and architectonic design; history and technique of stage and costume design. Hastings.

380 U 3
Intermediate Acting I
A. 2 2-hr. cl.
Prereq.: 281 or equiv.

381 U 3
Intermediate Acting II
W. 2 2-hr. cl.
Prereq.: 380.

510 U G 5
Stage Direction
A. 4 cl.
Prereq.: 280, and 365, or equiv.
Not open to students with credit for Speech (646).
Theories and principles of play direction.

520 U G 3
Technical Production
W. 3 cl.
Prereq.: 320 and 340.
Staging methods in non-typical scenic styles and periods for dramatic and musical productions. Cobes.

530* U G 3
Stage Lighting Technology
Sp. 3 cl.
Prereq.: 270 or equiv.
Study of electrical, mechanical, and electronic elements of lighting for the stage as prerequisite for the study of stage lighting design.

545 U G 3
Introduction to Scenic Design
W. 3 cl.
Prereq.: 340.
Study of fundamental principles and techniques of scenic design with experience in design for project productions.

565 U G 5
Children's Theatre: Production and Direction
Su, A, W, Sp. 5 cl.
Prereq.: 270.
Not open to students with credit for Speech 565 or (743).
Selection, production, and direction of plays for children.

571 U G 3
Theatre Repertory I
A. 3 cl.
Survey of representative realistic plays in the repertory of modern Western Theatre.

572 U G 3
Theatre Repertory II
W. 3 cl.
Survey of representative non-realistic plays in the repertory of modern Western Theatre.

573 U G 3
Theatre Repertory III
Sp. 3 cl.
Survey of representative classical and romantic works in the repertory of the Western Theatre.

605 U G 3
Acting in Period Drama
Sp. 2 2-hr. cl.
Prereq.: 281 or equiv.
Textual and character analysis, vocal and physical skills requisite for the acting of selected period dramas.

645 U G 3
Scenic Design in Staging Styles
Sp. 3 cl.
Prereq.: 545 or permission of instructor.
Study of the application of major stylistic trends in scenic design to modern theatrical productions through lecture-discussion and specific design projects.

650 U G 2
Advanced Stage Make-up
A. 2 cl.
Prereq.: 350.
Advanced theories and techniques of theatrical make-up with emphasis on problems in modern theatre styles.

655 U G 3
History of Costuming for the Stage
A. 3 cl.
Study of historical origins, uses, and modifications of clothing styles in the western world with emphasis on their application in modern theatrical productions.

671 U G 3
History of the Theatre
Su, W. 3 cl.
Prereq.: Engli. 229 or 262, Engli. 649 recommended.
Not open to students with credit for Speech (631) or 671.
Greek, Roman, Medieval, and Commedia dell'arte Theatre.
672 U G 3
History of the Theatre
Sp. 3 cl.
Prereq.: Engl. 220 or 262, Engl. 649 recommended.
Not open to students with credit for Speech (632) or 672.
Renaissance, Elizabethan, and Restoration Theatre.

673 U G 3
History of the Theatre
A. 3 cl.
Prereq.: Engl. 220 or 262, Engl. 649 recommended.
Not open to students with credit for Speech (633) or 673.
18th, 19th, and 20th-Century Continental, English, and American Theatre.

675 U G 5
American Theatre History
W. 5 cl.
Prereq.: 285 or permission of instructor.
Development of the American Theatre from 1752 to
the present; consideration of principal actors,
managers, playwrights, directors, and designers.

685* U G 3
Comparative Comedy
W. 3 cl.
Variation in the form of the comic genre from Greek
farce to contemporary comedy.

693 U G 1-5
Individual Studies in Theatre
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.
Conference, library, and laboratory work.

694 U G 1-5
Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

755 U G 3
Stage Costume Design
Sp. 1 cl.
Prereq.: 655.
Theory, methods, and materials of costume design with
emphasis on design problems for the stage. Chappell.

770 U G 3
Theatre Styles
A. 3 cl.
Prereq.: 510 or permission of instructor.
Not open to students with credit for Speech (651) or 770.
Study and analysis of significant styles of production
in the theatre.

780 U G 3
Advanced Acting Theory
Su, W. 2 2-hr. cl.
Prereq.: 185 or equiv.
Not open to students with credit for Speech (626) or 780.
A study of the major theories of the art of acting and
their application.

H783 U 3-5
Honors Course
Prereq.: 4th yr. standing; a grade of A in at least half
of the theatre courses taken and an average of B in
the remainder; permission of instructor under whose
supervision the work is to be completed and the
College Committee on Honors.
Failure to receive a grade of B in this course is a
disqualification for special honors.
Repeatable to a maximum of 15 cr. hrs.
An individual program of study, with conferences,
reports, and honors thesis.

786 U G 1
Stage Speech
Su, A, W, Sp. 4 1-hr. labs.
Repeatable to a maximum of 3 cr. hrs.
Advanced study of voice; phonetics; development of
special vocal techniques required for stage
performance.

789 U G 1
Advanced Actors Workshop
A, W, Sp. 4 1-hr. labs.
Repeatable to a maximum of 12 cr. hrs.

865 G 5
Advanced Theatre Direction
Su, Sp. 3 2-hr. cl.
Prereq.: 510 or permission of instructor.
Not open to students with credit for Speech (745) or 865.
Principles and techniques of direction and integration of
technical elements in the educational theatre.
Fee.

870 G 3
Bibliography and Methods
of Research in Theatre
A. 2 cl.
Methods and tools of research in all areas of theatre.
Fee.

875 G 5
Theatrical Criticism
Sp. 3 cl.
Prereq. or concur.: One of the following: Engl. 520,
624, or 649.
Not open to students with credit for Speech (735) or 875.
Critical theories from the Greek to the modern period
with particular reference to the influence of the
theorists, church, state, and press.
876 G 5
Classical Critical Theories of the Theatre
W. 5 cl.
Prereq. or concur.: 875 or equiv.
Detailed analysis of the classical sources of critical
theory of the theatre.

877 G 5
Modern Critical Theories of the Theatre
Sp. 2 2-hr. cl.
Prereq. or concur.: 875 or equiv.
Concentrated analysis and discussion of recent critical
theories of the theatre, especially since 1945;
examination of pivotal books in the field.

880 G 3-5
Advanced Studies in Theatre
Repeatable to a maximum of 40 cr. hrs. including cr. hrs. in Speech 880.
Fee.
a. Literature.
b. Theory and Criticism.
c. History.
d. Acting.
e. Directing.
f. Playwriting.
g. Management.
h. Design-Technical.
i. International Theatre.

970 G 2-5
Seminars in Theatre
Repeatable to a maximum of 40 cr. hrs. including cr. hrs. in Speech 840 and Speech 970.
Fee.
a. Literature.
b. Theory and Criticism.
c. History.
d. Acting.
e. Directing.
f. Playwriting.
g. Management.
h. Design-Technical.
i. International Theatre.

994 G 3-5
Group Studies in Theatre
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

999 G. Arr.
Research in Theatre
Research for thesis or dissertation purposes only.

University College

100 U 1
Freshman Survey
Su, A, W, Sp. 2 1-hr. cl.
Academic requirements and organization of the
University, nature of scholarly study, characteristics
of academically successful students, study techniques,
selection of degree programs, academic coping skills.

Veterinary Anatomy

Office: 102-A Sisson Hall, 1900 Coffey Road
Professors Venzke (Chairman) and Diesem; Associate
Professors Andres and de Wet; Instructor Hunter.

100 (451) U 5
Veterinary Anatomy
A. 5 cl.
Prereq.: Zool. 101 or equiv.
Lectures and demonstrations on specimens from the
various anatomical systems of domestic animals.
Fee.

410 (610) P 7
Anatomy of Domestic Animals
A. 4 cl., 8 lab. hrs.
Prereq.: Vet. Med. 1st yr. standing.
Morphology of the cow, sheep, and goat.
Diesem, Venzke, and Hunter.

411 (611) P 7
Anatomy of Domestic Animals
W. 4 cl., 8 lab. hrs.
Morphology of the horse, pig, and fowl.
Diesem, Venzke, and Hunter.

420 (618) P 4
Veterinary Embryology
A. 3 cl., 4 lab. hrs.
Prereq.: Vet. Med. 1st yr. standing.
Developmental anatomy of the chick, pig, cat, and
dog. Venzke and Andres.

430 (616) P 4
Veterinary Histology
W. 3 cl., 4 lab. hrs.
Prereq.: Vet. Med. 1st yr. standing.
Microscopic structure of the cell and fundamental
tissues. Andres and de Wet.

431 (617) P 4
Veterinary Histology
Sp. 3 cl., 4 lab. hrs.
Prereq.: Vet. Med. 1st yr. standing and 430.
Microscopic structure of organs. Andres, Venzke, and
de Wet.
Veterinary Clinics

Office: 1009 Veterinary Hospital, 2578 Kenny Road
Tharp (Director) and Rudy (Associate Director).

510 (721)(722)(723) P 3
Veterinary Clinics
A, W, Sp. 7 2-hr. lab.
Prereq.: Vet. Med. 3rd yr. standing.
Repeatable to a maximum of 9 cr. hrs.
Training in clinical procedures.

511 (724) P 6
Veterinary Clinics
Su. 7 24-hr. lab. duty, 1 cl.
Prereq.: Vet. Med. 4th yr. standing and 510.
Intense training in clinical work for one term.
Fee.

512 (725) P 15
Veterinary Clinics
A, W, Sp. 7 24-hr. lab. duty, 1 cl.
Prereq.: Vet. Med. 4th yr. standing and 511; 2 qtrs. required.
Training in clinical procedures, case work, and hospital management.

Veterinary Medicine

Office: 1009 Veterinary Hospital, 2578 Kenny Road

Professors: Tharp (Chairman), Krill (Emeritus), Donham, Donovan, Rheins, Venzke, Weary, and Whiteus;
Associate Professors: Gardner, Gisler, Loeb, Murdoch,
and Ray; Assistant Professors Capen, Carson, Heider,
Stilson, Wilson, and Wyman; Instructors: Allen, Dickey,
Hathaway, Hofsis, Hunter, Kerns, Pakes, Smetzer, and
Webster.

510 (620) P 2
Physical Diagnosis
Sp. 1 cl., 1 2-hr. lab.
Prereq.: Vet. Med. 2nd yr. standing.
The principles, procedures, techniques, and instrumentation used in conducting a thorough physical examination of all the domestic animals. Capen, Donovan, Weary, and Wyman.

520 (730) P 3
Diseases of Small Animals
A. 3 cl.
Prereq.: 510.
Principles of small animal medicine, including infectious, parasitic, and nutritional diseases of the canine, feline, and avian species. Capen, Donovan, and Wyman.
521 (731) P 3
Diseases of Small Animals
W.  3 cl.
Prereq.: 520.
Principles of small animal medicine, including the skin, endocrine, digestive, and urogenital systems of the canine, feline, and avian species. Capen, Donovan, and Wyman.

522 (732) P 3
Diseases of Small Animals
Sp.  3 cl.
Prereq.: 521.
Principles of small animal medicine, including the cardiovascular, respiratory, musculo-skeletal, and nervous systems of the canine, feline, and avian species. Donovan, Capen, and Wyman.

530 (735) P 4
Diseases of Large Animals
A.  4 cl.
Prereq.: 510.
Principles of large animal medicine, including management, nutrition and nutritional deficiencies, infectious, parasitic, and metabolic diseases of the porcine species. Wearn, Donovan, and Gardner.

531 (736) P 3
Diseases of Large Animals
W.  3 cl.
Prereq.: 530 and 532.
Principles of large animal medicine, including management, toxicology, nutrition and nutritional deficiencies, infectious and parasitic diseases of the bovine species. Wearn.

532 (740) P 4
Diseases of Large Animals
A.  4 cl.
Prereq.: 510.
Principles of large animal medicine, including management, toxicology, nutrition and nutritional deficiencies, infectious, parasitic, and metabolic diseases of the bovine species. Wearn, Murdock, and Donham.

540 (738) P 5
Obstetrics and Genital Diseases
Sp.  5 cl.
Prereq.: Vet. Med. 3rd yr. standing.
Lectures and demonstrations in obstetrics, diseases associated with reproduction and artificial insemination of domestic animals. Tharp and Murdock.

600 (719) (720) P 1
Veterinary Practice
W, Sp.  1 2-hr. cl.
Prereq.: Vet. Med. 4th yr. standing. 2 qtrs. required.
To acquaint the student with veterinary laws, business practices, opportunities and responsibilities that will be thrust upon him at graduation. Whiteus.

610 (750) P 3
Ophthalmology
A, W, Sp.  3 cl.
Prereq.: 510, 522, and Vet Physiol. and Pharmacol. 530.
A study of the eye of domestic animals, with emphasis upon diagnosis of the eye and the relation of this organ to general diseases. Donovan and Wyman. Fee.

620 P 5
Laboratory Animal Medicine
A.  3 cl., 3 2-hr. lab.
Prereq.: D.V.M. or permission of instructor.
A study of the diseases of laboratory animals with emphasis on colony management, diagnosis, and treatment. Pakes and Stilson. Fee.

621 P 5
Laboratory Animal Medicine
W.  3 cl., 3 2-hr. lab.
Prereq.: 620, D.V.M., or permission of instructor.
A study of the diseases of laboratory animals (primates, rabbits) with emphasis on management, diagnosis, and treatment. Pakes and Stilson. Fee.

693 (701) P 2-8
Individual Studies
Prereq.: Vet. Med. 4th yr. standing. Adequate clinical training and permission of instructor.
Special problems in veterinary medicine. Wearn, Donovan, Tharp, Murdock, Whiteus, and Wyman.

720 P 3-5
Advanced Internal Medicine
A.  3 cl., 6 lab. hrs. (optional)
Prereq.: 522, 531 or equiv., and permission of instructor.
Special consideration is given to diseases of the various organ systems, their abnormal function, prophylaxis, and therapy. Donovan and Murdock. Fee.

721 P 3-5
Advanced Internal Medicine
W.  3 cl., 6 lab. hrs. (optional)
Prereq.: 522, 531 or equiv., and permission of instructor.
Special consideration is given to diseases of the various organ systems, their abnormal function, prophylaxis, and therapy. Donovan and Murdock. Fee.

798 P 18
Residency in Veterinary Medicine
12 months full-time, beginning July 1.
Prereq.: Appointment as Resident, University Veterinary Hospital.
Repeatable, maximum of 216 cr. hrs.
Rotation through general medicine and medical sub-specialties; rounds; conferences; seminars and didactic programs.
Residency in Veterinary Ophthalmology
12 months full-time, beginning July 1
Prereq.: Appointment as Resident, University Veterinary Hospital.
Repeatable to a maximum of 216 cr. hrs.
Rotation through medicine and surgery of the eye and adnexa of all animal species; rounds; seminars; conferences and didactic programs.

Research in Veterinary Medicine
Research thesis or dissertation purposes only.
For participation in Clinical Instruction, see courses offered under Veterinary Clinics.

Veterinary Microbiology and Parasitology
Office: 304 Sisson Hall, 1900 Coffey Road
Professor Groves; Assistant Professor Scottorn (Acting Chairman).

Microbiology and Veterinary Parasitology
Sp. 4 cr., 1 2-hr. lab.
Prereq.: Vet. Med. 1st yr. standing.
Lectures and demonstrations on the classification, structure, reproduction, habitat, life history, control, and treatment of the nematode, cestode, and trematode parasites found in domestic animals. Groves.

Veterinary Parasitology
A. 3 cr., 1 2-hr. lab.
Prereq.: Vet. Med. 2nd yr. standing.
Lectures and demonstrations on the classification, structure, reproduction, habitat, life history, control, and treatment of the arthropods found in domestic animals. Groves.

Veterinary Parasitology
W. 3 cr., 1 2-hr. lab.
Prereq.: Vet. Med. 2nd yr. standing.
Lecture and demonstrations on the structure, reproduction, habitat, life history, control, and treatment of the protozoal parasites found in domestic animals. Scottorn and Groves.

Advanced Veterinary Parasitology
Prereq.: 410, 411, 412 or equiv., and permission of chairman.
Repeatable to a maximum of 15 cr. hrs.
Veterinary Pathology

Office: 207 Veterinary Pathology, 1925 Coffey Road
Professors Griesemer (Chairman), Cole (Regents), Farrell, Koestner, Liss, Marsh, and Yohn; Associate Professors Capen, McKissick, and Loeb; Assistant Professors Bishop, Fowler, Long, Shadduck, Skelley, and Olsen.

510 (621) P 6
General Pathology
A. 4 cl., 4 lab. hrs.
Prereq.: Vet. Med. 2nd yr. standing.
The principles of pathology, including etiology, reaction to injury, course and termination of disease; emphasis on functional, chemical, and morphological alterations in disease. Koestner, Capen, and Shadduck. Fee.

511 (622) P 6
Systemic Pathology
W. 4 cl., 4 lab. hrs.
Prereq.: 510.
Diseases of the nervous, endocrine, cardiovascular, hemic and lymphatic, digestive, respiratory, urinary, genital, musculo-skeletal and integumentary systems, and organs of special senses. Farrell, and McKissick. Fee.

512 (733) P 6
Veterinary Clinical and Systemic Pathology
Sp. 4 cl., 4 lab. hrs.
Prereq.: 511.
Correlation of functional, morphological, and chemical abnormalities in diseases of domestic and laboratory animals caused by toxic and radioactive materials, nutritional and metabolic disturbances, and infectious agents. Loeb, Fowler, and Shadduck. Fee.

610 (732) P 3
Avian Pathology
W. 3 cl.
Prereq.: 512.
Diseases of chickens, turkeys, caged birds, game birds, and water fowl. Marsh. Fee.

625 (610) P G 2-10
Pathology Technic
Pre req.: 512 or equiv., and permission of instructor.
Theory and application of technical methods employed in modern animal disease research; coordinated approach to animal disease investigation, including functional, chemical, gross, and histopathology. Farrell, Yohn, and Skelley. Fee.

693 (701) P G 1-10
Individual Studies
Pre req.: 512 or equiv. and permission of instructor.
Laboratory, library, conference, and reports concerning animal disease problems. Cole, Griesemer, Koestner, and Capen.

710 (775) P G 2-10
Advanced Systemic Pathology
Pre req.: 512, 625, 693 or equiv., and permission of instructor.
An advanced study of animal diseases as they affect all organ systems of the body. Griesemer, Capen, and Fowler. Fee.

715 (778) P G 2-10
Veterinary Surgical Pathology
Sp.
Pre req.: 710 and permission of instructor.
Biopsy methods and diagnosis; surgical specimens are studied, and emphasis is placed upon the correlation of lesions and functional pathology. Koestner and Fowler. Fee.

720 (786) P G 2-10
Animal Oncology
A.
Pre req.: 710 and permission of instructor.
A study of neoplasms occurring in animals, including identification, epidemiology, experimental production, cell culture, transplantation, and biological behavior. Griesemer, Koestner, and McKissick. Fee.

850 (807) G 1
Seminar in Veterinary Pathology
Repeatable to a maximum of 16 cr. hrs.
Fee.

999 (950) G Arr.
Research in Veterinary Pathology
Research for thesis or dissertation purposes only.
For participation in Clinical Instruction, see courses offered under Veterinary Clinics.

Veterinary Physiology and Pharmacology

Office: 351 Sisson Hall, 1900 Coffey Road
Professors Powers (Acting Chairman), Marks, and Davis; Associate Professors Hamlin and Yearly; Instructor Wright.

210 (516) U 5
Animal Physiology
A. 4 cl., 1 3-hr. lab.
Pre req.: Chem. 102 or 122.
Not open to students with credit for 410 or 411.
Consideration of concepts and principles involved in the function of various body systems and principles of growth and aging. Fee.
211 (517) U 5
Animal Physiology
W. 4 cl., 1 3-hr. lab.
Prereq.: Chem. 102 or 122.
Not open to students with credit for 532.
Comparative study of physiological concepts and
principles involved in reproduction and metabolism in
various species of domestic animals. Fee.

530 (610) P G 5
Physiology of Domestic Animals
Sp. 4 cl., 3 lab. hrs.
Prereq.: Vet. Med. 1st yr. standing or permission of
instructor.
Physiology of peripheral nerve, central nervous system,
sense organs, blood, lymph, and special fluid systems
of the body. Smith and Staff. Fee.

531 (611) P G 5
Physiology of Domestic Animals
A. 4 cl., 3 lab. hrs.
Prereq.: 530 and Vet. Med. 2nd yr. standing, or
permission of instructor.
Physiology of the cardiovascular and respiratory
systems; digestion in the simple stomach and rumen.
Smith and Hamlin. Fee.

532 (622) P G 5
Physiology of Domestic Animals
W. 3 cl., 3 lab. hrs.
Prereq.: 531 and Vet. Med. 2nd yr. standing, or
permission of instructor.
Physiology of digestion, metabolism, renal physiology,

630 P G 5
Veterinary Pharmacology
A. 5 cl.
Pharmaceutical standards and preparations; metrology;
pharmacology; prescription writing; basic principles of
pharmacodynamics; drugs acting on the neuromuscular
system, skin, mucous membranes, and digestive tract
of domestic animals. Powers and Yeary. Fee.

632 P G 4
Veterinary Pharmacology
W. 4 cl.
Prereq.: 630 or permission of instructor.
Antibiotic drugs; hormones used as drugs; drugs
acting on the cardiovascular system of domestic
animals. Powers and Yeary. Fee.

693 (701) P G 3-15
Individual Studies
Prereq.: 532, 632, or permission of instructor.
Laboratory and library investigations concerning
animal physiology and pharmacology problems.
Smith, Powers, Hamlin, and Yeary.

694 P G 2-5
Group Studies
Prereq.: Permission of instructor.
Repeatable to a maximum of 20 cr. hrs.

779 P G 5
Comparative Mammalian Toxicology
Sp. 4 cl., 2-hr. lab.
Principles of comparative mammalian toxicology and
their relationships to the safety evaluation of chemical
substances. Yearly.

780 P G 5
Antimicrobial and Endocrine Therapy
Sp. 3 cl., 2-hr. lab.
Prereq.: 532, 632, Microbiol. 614, Biochem. 511 and
521, or equiv.; Vet. Med. 3rd yr. standing or permission
of instructor.
A detailed study of the basic principles and clinical
application of endocrines and antimicrobial drugs in

790 P G 3
Veterinary Physiology
A. 2 cl., 2 lab. hrs.
Prereq.: 532 or equiv. in advanced mammalian physiol.
Comparative electrophysiology. Hamlin and Smith.
Fee.

791 P G 3
Veterinary Physiology
W. 2 cl., 2 lab. hrs.
Prereq.: 532 or equiv. in advanced mammalian Physiol.
Comparative hemodynamics and cardiovascular sound.
Hamlin and Smith. Fee.

792 P G 3
Veterinary Physiology
Sp. 2 cl., 2 lab. hrs.
Prereq.: 532, 791, or equiv. in advanced mammalian
physiol.
Advanced comparative cardiovascular physiology with
emphasis upon circulatory response to stress of various
genital and acquired cardiovascular defects.
Hamlin and Smith. Fee.

799 P G 2
Seminar
A, W, Sp. 1 2-hr. conf. and lec.
Prereq.: Permission of instructor.
Repeatable to a maximum of 30 cr. hrs.
Lectures and conferences on selected topics in
veterinary physiology and pharmacology. Fee.

999 (950) G Arr.
Research in Veterinary Physiology
and Pharmacology
Research for thesis or dissertation purposes only.
For participation in Clinical Instruction, see courses
offered under Veterinary Clinics.
Veterinary Preventive Medicine

Office: 252 Sisson Hall, 1900 Coffey Road

Professors Helwig (Chairman), Bohl, Ferguson, Jones, and Tzyzni; Assistant Professors Builer, Dahl, and Robinson.

200 (452) U 3
Basic Animal Hygiene
A. 3 cl.
Causes of disease and the relationship of these causes to the animal’s environment. Helwig and Dahtl.

201 (453) U 3
Applied Animal Hygiene
W. 3 cl.
Prereq.: 200 or equiv.
Various common diseases responsible for losses to the livestock industry, with emphasis on control. Helwig and Robinson.

510 (620) P 3
Hygiene and Environmental Sanitation
A. 3 cl.
Prereq.: Vet. Med. 3rd yr. standing.
A disease prevention study of the environmental factors which have a direct influence on animal and human health; an introduction to epidemiology and biostatistics. Helwig and Jones.

511 (745) P 3
Prevention and Control of Communicable Diseases
W. 3 cl.
Prereq.: Vet. Med. 3rd yr. standing or permission of instructor.
Prevention of animal communicable diseases, based on contemporary medical knowledge, is correlated with administrative control and public health. Helwig and Staff.

512 (742) P 4
Food Hygiene and Public Health
Sp. 3 cl., 2 2-hr. lab.
Prereq.: Vet. Med. 3rd yr. standing or permission of instructor.
Principles and practices of food sanitation with emphasis on the veterinarian’s role in protecting the public food supply.

610 (740) P 15
Applied Preventive Medicine
A, W, Sp. Full-time offcampus cl. and lab.
Intensive practical training: Public Health and Food Hygiene, meat inspection, Federal and State Disease Control Programs, and Herd Disease Management. Department Staff and Cooperating Governmental Agencies.

616 (750) P G 5
Germfree and Gnotobiotic Animals
W, Sp. 3 2-hr. cl. and lab.
Prereq.: Advanced standing in Biological Sciences, Microbiol. 607, or equiv., and permission of instructor.
The instrumentation of biological research through application of germfree and gnotobiotic animals. Fee.

693 (701) P G 2-5
Individual Studies
Prereq.: 510 and permission of instructor.
Laboratory and library investigations of animal disease problems involving Veterinary Preventive Medicine. Helwig and Jones.

785 (730) P G 3
Biological Research Techniques
A, W, Sp. 2 2-hr. cl. and lab.
Prereq.: Advanced standing in Biological Sciences, Microbiol. 607, or equiv., and permission of instructor.
The more common laboratory animals used in biological research and testing will be dealt with as they relate to research purposes, design, and application. Fee.

810 G 3-8
Veterinary Public Health
Su, A, W.
Prereq.: 610.
Laboratory and library investigation of veterinary public health problems. Helwig, Jones, and Russell.
Fee.

850 (800) G 1
Seminar in Veterinary Preventive Medicine
Repeatable to a maximum of 3 cr. hrs.

999 (950) G Arr.
Research in Veterinary Preventive Medicine
Research for thesis or dissertation purposes only. For participation in Clinical Instruction, see courses offered under Veterinary Clinics.

Veterinary Surgery and Radiology

Office: 1095 Veterinary Hospital, 2578 Kerny Road

Professors Rudy (Chairman) and Johnson, Associate Professors Gabel, Hohn, and Wilson; Assistant Professor Gurt.

510 (623) P 5
General Surgery
Sp. 4 cl., 2 2-hr. lab.
Prereq.: Vet. Med. 2nd yr. standing.
Veterinary Radiology
A. 2 cl., 2-hr. lab.
Prereq.: Vet. Med. 3rd yr. standing.
Presentation of the principles of diagnostic and therapeutic radiology, including nuclear medicine; laboratory demonstrations include interpretation of radiographs and radiological technique and protection.
Burl. Fee.

Special Surgery
W. 6 cl.
Prereq.: 510 and 520.

Special Surgery
Sp. 6 cl.
Prereq.: 530.
Lectures, recitations, and demonstrations on the diagnosis and treatment of surgical diseases of large animals, including horses, cattle, sheep, and swine. Gabel, Johnson, and Wilson. Fee.

Surgical Operations
A, W, Sp. 1 4-hr. lab.
Prereq.: 531.
Surgical exercises. Fee.

Individual Studies
Prereq.: Vet. Med. 4th yr. standing.
Laboratory and library investigations of diseases requiring advanced surgery and radiology techniques.

Residency in Veterinary Radiology
12 months full-time, beginning July 1.
Prereq.: Appointment as Resident, University Veterinary Hospital.
Repeatable to a maximum of 216 cr. hrs.
General diagnostic radiology, radiation therapy, nuclear medicine, special diagnostic and therapeutic procedures, conferences, and seminars.

Residency in Veterinary Surgery
12 months full-time, beginning July 1.
Prereq.: Appointment as Resident, University Veterinary Hospital.
Repeatable to a maximum of 216 cr. hrs.
Rotation through general surgery and surgical sub-specialties; rounds, conferences, and seminars.

Research in Veterinary Surgery or Veterinary Radiology
Research for thesis or dissertation purposes only.
For participation in Clinical Instruction, see courses offered under Veterinary Clinics.

Welding Engineering
Office: 124 Welding Engineering Laboratories, 130 West 19th Avenue

Professors McCauley (Chairman), R. Green, and McMaster (Regents); Associate Professors Funk and Jackson; Assistant Professors W. Greer and Libby.

Forging, Heat Treating, and Welding
A, W, Sp. 3 cl., 3 1-hr. lab.
Not open to students with credit for (418).
Safety glasses must be worn in laboratory.
Welding fundamentals and applications; intended for students not having an engineering background; laboratory work designed to augment classroom discussions and provide basic welding skills. Fee.

Introduction to Welding Engineering
W. 3 cl., 1 3-hr. lab.
Prereq.: 3rd yr. standing or permission of instructor.
Safety glasses must be worn in laboratory.
An introduction to welding engineering for undergraduate students to familiarize them with the broad field of welding engineering and particularly welding processes. Jackson. Fee.

Applied Engineering Analysis
A. 3 cl., 1 3-hr. lab.
Prereq.: Physics 123 and Math. 255.
The analysis of engineering systems by the application of fundamental principles of conservation of matter and energy, and operational techniques. McMaster.

Welding Engineering Inspection Trip
Safety glasses are required.
A group visit to various industrial plants; the plants selected are generally grouped in one community; a written report is required.

Practical Experience in a Welding Organization
A. 10 wks. during Su. Qtr.
Prereq.: Weld. E, 3rd yr. standing.
Experience in an engineering organization and the preparation of an acceptable report on the organization and the work done before beginning the 4th year.
<table>
<thead>
<tr>
<th>Code</th>
<th>UG 3</th>
<th>Title and Description</th>
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<tbody>
<tr>
<td>501</td>
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<td>Principles of Welding</td>
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<tr>
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<td>Sp. 3 cl., 1 3-hr. lab.</td>
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<td>Prereq.: 401, 430, and Elec. E. 500.</td>
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<td>Safety glasses must be worn in laboratory.</td>
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<td>Theory, equipment, techniques, and control of fusion welding with electric arc, gas, and other processes; welding codes and specifications; application of electrodes and processes. Libby. Fee.</td>
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<td>588</td>
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<td>Welding Engineering Inspection Trip</td>
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<td>Sp. 1 wk. between W. and Sp. Qtr.s.</td>
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<td>Safety glasses are required.</td>
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<tr>
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<td>A group visit to various industrial plants; the plants selected are generally grouped in one community; a written report is required.</td>
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<td>589</td>
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<td>Practical Experience in Welding Industry</td>
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<td>A. 10 wks. during Su. Qtr.</td>
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<td>Prereq.: Weld. E. 4th yr. standing.</td>
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<td>Experience in an engineering organization and the preparation of an acceptable report on the organization and the work done before beginning the 5th year.</td>
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<tr>
<td>602</td>
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<td>Principles of Resistance Welding</td>
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<td>W. 3 cl., 1 3-hr. lab.</td>
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<td>Prereq.: 430 and Elec. E. 520.</td>
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<td>Safety glasses must be worn in laboratory.</td>
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<td>Theory and operation of resistance welding equipment, power supplies, electronic controls, welding codes and schedules, and process controls. McMaster. Fee.</td>
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<tr>
<td>610</td>
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<td>Physics of Welding</td>
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<td>A. 3 cl., 1 3-hr. lab.</td>
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<td>Safety glasses must be worn in laboratory.</td>
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<td>The application of basic principles in the welding processes. Funk. Fee.</td>
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<tr>
<td>611</td>
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<td>Theory of Welding</td>
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<td>W. 4 cl., 1 3-hr. lab.</td>
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<td>Safety glasses must be worn in laboratory.</td>
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<td>The application of basic metallurgical principles in the welding processes; the weldability of metals is studied; laboratory work involves physical and metallurgical examination of welded specimens. Jackson. Fee.</td>
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<td>612</td>
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<td>Application of Welding Engineering</td>
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<td>Sp. 3 cl., 1 3-hr. lab.</td>
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<td>Prereq.: 611.</td>
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<td>Safety glasses must be worn in laboratory.</td>
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<td>The principles by which manufacturing procedures for materials may be developed; an analysis of processing methods; material, physical and mechanical properties, inspection, and performance and service testing. McCauley. Fee.</td>
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<tr>
<td>630</td>
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<td>Analysis of Continuous Systems</td>
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<td></td>
<td>W. 3 cl.</td>
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<td>Prereq.: 410 or permission of instructor.</td>
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<td>An energy analysis of analogous one-dimensional linear distributed systems with applications to welding process and control systems. McMaster.</td>
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<td>631</td>
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<td>Nondestructive Testing</td>
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<td>A. 3 cl., 1 3-hr. lab.</td>
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<td>Safety glasses must be worn in laboratory.</td>
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<td>Principles, equipment, techniques, and interpretation of nondestructive tests with X-rays, radioisotopes, magnetic fields, penetrants, ultrasonics, eddy currents, and other probing media. McMaster. Fee.</td>
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<tr>
<td>640</td>
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<td>Welding Science and Its Application</td>
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<td>W. 3 cl.</td>
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<td>A study of the engineering fundamentals of welding; design, materials, and processes are considered as related to the welding field. W. Green.</td>
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<tr>
<td>680</td>
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<td>Continuous Systems Laboratory</td>
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<td>W. 1 3-hr. lab.</td>
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<td>Concur.: 630.</td>
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<td>Laboratory exercises in measurement of transients in continuously-distributed linear engineering systems (particularly on advanced welding equipment), and analog computer solutions where feasible.</td>
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<tr>
<td>704</td>
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<td>Theory of High Density Welding Processes</td>
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<td>Sp. 3 cl.</td>
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<td>Prereq.: 501; and Physics 551 or 743 or equiv.; or permission of instructor.</td>
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<tr>
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<td>Theory of physical and thermal processes in high-pressure arc, plasma, electron beam, laser, and other high-energy-density welding processes. McMaster.</td>
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<tr>
<td>705</td>
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<td>Principles of Welding Process Control Systems</td>
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<td>Sp. 3 cl.</td>
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<td>Prereq.: 430, 501, 602, and Elec. E. 650 or permission of instructor.</td>
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<tr>
<td>706</td>
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<td>Welding Design</td>
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<td>A. 3 cl., 1 3-hr. lab.</td>
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<td>Prereq.: Civil E. 511.</td>
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<td>The analysis and design of statically determinate and indeterminate members and structures; a study of welding procedures for shop fabrication and field erection. W. Green. Fee.</td>
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</tbody>
</table>
Welding Design
W. 3 cr., 1 3-hr. lab.
The analysis and design of machinery elements and frames to a given set of shop conditions and facilities; emphasis on cost factor considerations.
W. Green.

Welding Design
Sp. 3 cr., 1 3-hr. lab.
Prereq.: 602 and 721.
The design of resistance welded products; a selection of process and equipment and a study of tooling used in high production work.
W. Green.

Welding Process Control Laboratory
Sp. 1 3-hr. lab.
Concur.: 765.
Laboratory experiments in basic instrumentation and control systems for welding processes such as arc, resistance, electron-beam, and others.

Special Problems in Welding Engineering
Prereq.: 4th yr. standing and permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Special studies not offered in the fixed curriculum in the areas related to courses 501, 601, 610, 611, 612, and 631; this work may be taken in more than one area.

Thesis
Prereq.: 4th yr. standing and permission of instructor.
Repeatable to a maximum of 15 cr. hrs.
Undergraduate research providing an opportunity to publish a report in appropriate technical publications.

Advanced Problems in Welding Engineering
Prereq.: Permission of instructor.
Repeatable to a maximum of 24 cr. hrs.
Special studies not offered in the fixed curriculum; work may be taken under one or more of the special topics in the field including theory of welding processes and their physical mechanics, weldability of materials, advanced studies in welding design, theory and methodology of nondestructive testing, and fundamental application of welding processes to industrial technology.

Research in Welding Engineering
Research for thesis or dissertation purposes only.

Zoology
Office: 104 Botany and Zoology Building, 1726 Neil Avenue

Professors Peterle (Chairman), Borror, Britt, Cristes, Giltz, Haub, Kostir (Emeritus), D. F. Miller (Emeritus), J. A. Miller (Emeritus), J. N. Miller, Mitchell, Mysar, Price (Emeritus), Putnam, Reese (Emeritus), Rothenbuhler, Tidd, Trautman (Emeritus), and Venard; Associate Professors Bookhout, Collivaux, Dyer, Good, Kessler, Miskimen, Monot, Parrish, Stansbery, Stevens, Tubb, and Valentine; Assistant Professors Carey, Gaunt, Lustick, and Tassava; Adjunct Assistant Professor Smith; Instructors Burnard, Stone, and Taub.

General Zoology
A, W, Sp. 2 cr., 3 1-hr. labs.
Prereq.: Biol. 100.
Not open to students with credit for 401 or 402.
A study of the variety of animals with emphasis on organ systems and their functions, the interrelationships with each other, space, and time.
Haub. Fee.

Introduction to Ecology
(See Biol. 313.)

Invertebrate Zoology
Sp. 3 cr., 2 2-hr. labs.
Prereq.: 101 or equiv.
Not open to students with credit for 402.
A survey of the invertebrates with emphasis on morphology and relationships of representative types.
Mitchell. Fee.

Ornithology
Sp. 2 cr., 1 2-hr. lab.
Prereq.: 101 or equiv. and 10 additional cr. hrs. in Biological Sciences.
A study of the general biology and classification of birds, with emphasis on field identification of local species; field trip each Saturday.
Giltz. Fee.

Functional Anatomy and Physiology I
A, W. 3 cr., 2 2-hr. labs.
Prereq.: Biol. 100.
The dermal, skeletal, and muscular systems with emphasis on man.
Fee.

Functional Anatomy and Physiology II
W, Sp. 3 cr., 2 2-hr. labs.
Prereq.: 231.
The metabolic systems with emphasis on man.
Fee.

Functional Anatomy and Physiology III
Sp. 3 cr., 2 2-hr. labs.
Prereq.: 232.
The homeostatic and reproductive systems with emphasis on man.
Fee.
Comparative Vertebrate Anatomy
A, W. 3 cl., 2 3-hr. labs.
Not open to students with credit for Anat. 389.
Comparative anatomy of vertebrates through mammals
with reference to modifications of their basic structural
plan as illustrated by representative vertebrates. Gaunt.
Fee.

Vertebrate Embryology
Sp. 3 cl., 2 3-hr. labs.
Prep.: 234 or equiv.
Not open to students with credit for Anat. 616.
Embryology of representative amphibia, birds, and
lower mammals from fertilization through
organogenesis. Price and Tassava. Fee.

General Physiology
W. 2 cl., 2 3-hr. labs.
Prep.: Organic Chem., Physics 113 or equiv., and 15
cr. hrs. Biological Sciences.
A laboratory survey of physiological mechanisms in
animals. Lustick. Fee.

Basic Concepts and Recent Advances
in Zoology
W. 3 2-hr. cl.
Prep.: High school teacher status and 15 cr. hrs.
natural science at the 200 level.
Animal functions and genetic and environmental
interrelationships in time and space as illustrated by
selected animal types. Tidd. Fee.

General Histology
W. 3 cl., 2 3-hr. labs.
Prep.: 234 or equiv.
Not open to students with credit for Anat. 607.
A detailed study of the tissues of vertebrate animals,
and a general survey of the microscopic structure of
various organs. J. N. Miller. Fee.

Principles of Physiology
Sp. 3 cl., 2 3-hr. labs.
Prep.: Academic Year Science Institute students only.
15 cr. hrs. Biological Sciences, 15 cr. hrs. Chem., and/or
Physics, and permission of instructor.
The nature and behavior of living organisms and their
relationship to their environment with special
consideration of the functions of vertebrate organ
systems. Lustick. Fee.

Animal Parasites
A, W, Sp. 2 cl., 3 3-hr. labs.
Prep.: 101 or equiv., Jr. standing or above, and
permission of instructor.
The general principles of parasitology, the morphology,
life history, and classification of parasites, and their
host relationships; recommended for students preparing
for medical or zoological work. Miller. Fee.

Animal Parasitology
Su (2nd term). Franz Theodore Stone Lab., 3 all-day
cl. per wk.
Prep.: 101 or equiv.
Emphasis on the parasites infecting freshwater
vertebrates, including field and laboratory experiences,
host examination, and techniques dealing with staining,
fixing, and mounting of specimens.

Invertebrate Zoology
Su (2nd term). Franz Theodore Stone Lab., 3 all-day
cl. per wk.
Prep.: 101 or equiv.
The collection and identification of invertebrate
animals, development of methods of classification, and
use of keys.

Zoology of Vertebrates
A, Sp. 3 cl., 2 2-hr. labs.
Prep.: 101 or equiv.
A study of the various vertebrate groups, emphasizing
their origin, phylogeny, classification, life histories,
habits, distribution, and economic importance. Fee.

Ichthyology
Su (1st term). Franz Theodore Stone Lab., 3 all-day cl.
per wk.
Prep.: 101 or equiv.
Study of the distribution and classification of fishes,
which includes methods of identification, collection,
and preservation.

Herpetology
Su (2nd term). Franz Theodore Stone Lab., 3 all-day
cl. per wk.
Prep.: 101 or equiv.
Local species of reptiles and amphibians, their habits,
life histories, ecology, and classification. Britt.

Biology of Birds
W. 2 cl., 1 2-hr. lab.
Prep.: 101 or equiv.
The aspects of anatomy, physiology, taxonomy, and
behavior which are pertinent to the study of birds.
Putnam. Fee.

Advanced Ornithology
Su (1st term). Franz Theodore Stone Lab., 3 all-day cl.
per wk.
Prep.: 101 or equiv.
Topics include instinctive behavior of the life of birds,
the breeding cycle, social relations, ter-ri-ory, ecology,
characteristics of population, and techniques in field
study of birds. Putnam.
625 (629) U G 5
Mammalogy
W. 3 cl., 2 2-hr. labs.
Prereq.: 101 or equiv.
The comparative morphology, taxonomy, life histories, distribution, and importance of the mammals. Good. Fee.

626 U G 5
Biology of Fishes
A. 3 cl., 1 3-hr. lab.
Prereq.: 101, 15 cr. hrs. in Biological Sciences, and
permission of instructor.
The laboratory emphasizes ecological and systematic ichthyology; lectures emphasize the behavior, migration, distribution, and evolution of fishes. Momot. Fee.

630 (632) U G 5
Comparative Embryology
W. 3 cl., 2 2-hr. labs.
Prereq.: 101 or equiv.
A survey of various modes of embryonic development, illustrated with both invertebrate and vertebrate type material with emphasis on fundamental aspects and processes. Tassava. Fee.

633 U G 5
Vertebrate Physiology
Sp. 2 cl., 3 3-hr. labs.
Prereq.: Chem. 521; undergraduates must have credit for Zool. 432.
The physiology of vertebrate animals with emphasis on exchange rates, metabolic rates, energetics, and homeostasis. Lustick. Fee.

640 (605) U G 5
Animal Behavior
W. 3 cl., 2 2-hr. labs.
Prereq.: 101 or equiv.

650 (636) U G 5
Principles of Animal Ecology
Sp. 3 cl., 2 2-hr. labs., Sat. field trips.
Prereq.: Biol. 313.
Principles and methods of animal ecology and their application to other closely related biological sciences. Stansberry. Fee.

651 (642) U G 4
Field Zoology
Su (1st term). Franz Theodore Stone Lab., 3 all-day cl. per wk.
Prereq.: 101 or equiv.
Field and laboratory identification of aquatic and terrestrial vertebrates and invertebrates of the region, in relation to habitats occupied; of special interest to biology teachers.

652 U G 4
Limnology
Su (1st term). Franz Theodore Stone Lab., 3 all-day cl. per wk.
Prereq.: 101 or equiv., 10 cr. hrs. in Chem., 10 cr. hrs. in Physics.
Study of physical, chemical, and biological factors influencing fresh water life; field and laboratory techniques for determining area, chemical, natural flora, and fauna are emphasized. Britt.

653 (623) U G 4
Fish Ecology
Su (2nd term). Franz Theodore Stone Lab., 3 all-day cl. per wk.
Prereq.: 621 or equiv.
Studies of life histories and interspecific relationships of fishes and of the various factors influencing their abundance.

654* (637) U G 4
Ecological Physiology of Aquatic Animals
Su (2nd term). Franz Theodore Stone Lab., 3 all-day cl. per wk.
Prereq.: 101 or equiv., and 10 cr. hrs. of Chem., Physics, or Physiol.
Study of the aquatic habitat includes physical and chemical adjustment, tolerance, and acclimatization to environment of vertebrates and invertebrates.

655 U G 5
Limnology
A. 3 hr. lec.—seminar, 1 4-hr. lab.
Prereq.: 10 cr. hrs. Chem., 20 cr. hrs. in Biological Sciences, and permission of instructor.
A study of the physical, chemical, and biological factors influencing the biological productivity of inland waters and of techniques and equipment used in evaluating them. Britt and Tubb. Fee.

660 (607) U G 5
Fisheries Biology
Sp. 3 cl., 2 2-hr. labs.
Prereq.: Biol. 410 or equiv.
The productivity of fish populations and the ecological relationships between fishes and other aquatic organisms. Fee.

661 (640) U G 5
Wildlife Biology
A. 3 cl., 2 2-hr. labs.
Prereq.: 101 or equiv.
An introductory course in the biology and importance of wildlife; emphasis on Ohio game birds and mammals. Fee.

662 (641) U G 5
Wildlife Biology Techniques
W. 3 cl., 2 2-hr. labs., Sat. field trips.
Prereq.: 15 cr. hrs. in Biol. or Zool. above the 200 level, including Biol. 313.
Techniques employed in the field of wildlife biology, with emphases on game birds and mammals; designed for zoology majors specializing in wildlife biology. Bookhout. Fee.
693  (701)  U 2-5  G 2-10

Individual Studies
Prereq.: Permission of instructor.
Individual work in the field of the chosen problem.
  a. Anatomy.
     Gaunt.
  b. Animal Behavior.
     Haub, Putnam, Rothenbuhler, Gaunt, and Good.
     Peterle, Good, Britt, Stansbery, Glitz, Collinvaux, Mitchell, and Momot.
  d. Embryology and Vertebrate Zoology.
     Tassava.
  e. Invertebrate Zoology.
     Britt, Crites, Mitchell, Tidd, and Tubb.
  f. Ornithology.
     Borr, Gaunt, Lustick, Miskimen, Putnam, and Kessler.
  g. Parasitology.
     Crites, Miller, Tidd, Venard, and Mitchell.
  h. Wildlife Biology.
     Peterle, Good, and Bookhout.
  i. General Limnology.
     Britt, Momot, Collinvaux, Tubb, and Taub.
  j. Comparative Physiology.
     Lustick and Tassava.
  k. Electron Microscopy.
     Parrish.
     Peterle and Mitchell.
  m. Systematics.
  n. Ichthyology.
     Momot and Trautman.

694  (701)  U G 2-5

Group Studies
Prereq.: Permission of instructor.
Group work in the field of the chosen problem (see topics in 693).

800  G 3

Zoological Literature and Preparation of Manuscripts
W.  2 cr., 1 2-hr. lab.
Prereq.: 15 cr. hrs. of Biol., Entom., or Zool. at the 600 level or above.
A study of library organization bibliographies, and guides to zoological literature; the preparation of scientific papers for publication. Venard.

811+  (832)  G 5

Advanced Zoology of Invertebrates
Sp.  3 cr., 2 2-hr. labs. Field trips including 1 wk. optional trip to a marine lab.
Prereq.: 211 or equiv. and permission of instructor.
A study of the morphology, physiology, life histories, and classification of the eucoelomate invertebrates and the annelid worms. Crites. Fee.

812+  (833)  G 5

Advanced Zoology of Invertebrates
Sp.  3 cr., 2 2-hr. labs. Field trips including 1 wk. optional trip to a marine lab.
Prereq.: 211 or equiv. and permission of instructor.
A study of the morphology, physiology, life histories, and classification of the eucoelomate invertebrates exclusive of annelid worms. Crites. Fee.

840  G 5

Behavior Genetics
W.  3 1½-hr. cl.
Prereq.: Genetics 630; and Zool. 640 or Psych. 300; or equiv.
Development of ethological theory, genetic bases of behavioral differences, and evolution of behavior in laboratory, wild, and domestic species of both vertebrates and invertebrates. Rothenbuhler.

841  G 3

Bioacoustics
Sp.  1 cr., 2-hr. lab. and field trip.
Prereq.: Permission of instructor.

851  G 5

Population Ecology
W.  5 cr.
Prereq.: 650 and Biol. 313.
Interactions of animal populations considered from the environmental, physiological, and biometrical aspects. Peterle.

880  (900)  G 2

Seminar
A.  1 cr.
Required of all graduate majors in zoology during the first Autumn Quarter of registration.

881  (900)  G 1

Seminar
Repeatable to a maximum of 5 cr. hrs.
Selected topics to be announced.

896  G 1-3

Interdepartmental Seminar in Polar and Alpine Studies
Sp.
(See under Interdepartmental Seminars.)

897  G 1

Interdepartmental Seminar in Natural Resources
(See under Interdepartmental Seminars.)

999  (950)  G Arr.

Research in Zoology
Research for thesis and dissertation purposes only.
### Library Calendar 1970-71

The schedule of hours is subject to change. Consult specific library concerned for further information and summer hours.

**MAIN LIBRARY REGULAR SCHEDULE OF HOURS**

<table>
<thead>
<tr>
<th>Autumn, Winter, and Spring Quarters</th>
<th>Monday through Friday</th>
<th>Saturday</th>
<th>Sunday</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>7:45 a.m.—12 midnight</td>
<td>8 a.m.—10 p.m.</td>
<td>1 p.m.—12 midnight</td>
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</tbody>
</table>

**Summer Schedule**

<table>
<thead>
<tr>
<th>Monday through Friday</th>
<th>7:45 a.m.—12 midnight</th>
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</thead>
<tbody>
<tr>
<td>Saturday</td>
<td>8 a.m.—5 p.m.</td>
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<tr>
<td>Sunday</td>
<td>1 p.m.—6 p.m.</td>
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</tbody>
</table>

**Between-Quarter and Holiday Schedule**

<table>
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<tr>
<th>Monday through Friday</th>
<th>8 a.m.—7 p.m.</th>
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<tbody>
<tr>
<td>Saturday</td>
<td>8 a.m.—5 p.m.</td>
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<tr>
<td>Sunday</td>
<td>1 p.m.—6 p.m.</td>
</tr>
</tbody>
</table>

Department libraries' regular schedules are listed below. Between-quarter and holiday hours vary. Schedules are posted in these libraries and also in the Main Library.

**SUMMER QUARTER 1970**

<table>
<thead>
<tr>
<th>June 23</th>
<th>Begin Summer Quarter hours. Independence Day closed—All libraries closed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 3</td>
<td>Begin Between-Quarter Schedule at 5 p.m.</td>
</tr>
<tr>
<td>September 4</td>
<td>Begin Between-Quarter Schedule at 5 p.m.</td>
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</tbody>
</table>

**AUTUMN QUARTER 1970**

<table>
<thead>
<tr>
<th>September 6-7</th>
<th>Labor Day Weekend—All libraries closed.</th>
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</thead>
<tbody>
<tr>
<td>September 30</td>
<td>Begin Autumn Quarter hours.</td>
</tr>
</tbody>
</table>

**DEPARTMENT AND OTHER LIBRARIES—Autumn, Winter, and Spring Quarters**

| Aero-Civil Engr., 322 Civil Aero. Engr. Bldg. | 8-10 | 8-10 |
| Agriculture, 45 Agricultural Admin. Bldg.    | 8-10 | 8-10 |
| Agronomy Dept., 111 Townsend Hall            | 8-12 | 1:5  |
| Botany & Zoology, 200 Botany & Zoology Bldg. | 8-10 | 8-10 |
| Brown, 103 Brown Hall                        | 8-10 | 8-10 |
| Buckeye Village                              | 7-12 | mid. |
| Chemistry, 310 McPherson Chem. Lab.          | 8-10 | 8-10 |
| Children's Hospital, 501 S. 17th St.        | 8:30 | 9:30 |
| Commerce, 204 Page Hall                      | 8-10 | 8-10 |
| Davis Welding, 200 Welding Engr. Labs.       | 8-5  | 8-5  |
| Education, 660 Arps Hall                     | 7:30 | 10   |
| Electrical Engineering, 102 Caldwell Lab     | 8-10 | 8-10 |
| English Dept., 15-15C Derby Hall             | 8-5  | 7-10 |
| Fine Arts, 204 Main Library                  | 8-10 | 8-10 |
| Health Center, 101 Hamilton Hall             | 8-10 | 8-10 |
| Home Economics, 325 Campbell Hall            | 8-10 | 8-10 |
| Journalism, 109 Journalism Bldg.             | 8-10 | 8-10 |
| Law, 239 Law Bldg.                           | 7:45 | 12   |
| (Use limited to legal research)              |      |      |
| Materials Engr., 197 Watts Hall              | 8-10 | 8-10 |
| Mathematics, 910 Mathematics Bldg.           | 8-10 | 8-10 |
| Mechanical Engineering, 2071 Robinson Lab.   | 8-5  | 8-5  |
| Microbiology, 7 Cockins Hall                 | 8-10 | 8-10 |
| Music, 101 Hughes Hall                       | 8-10 | 8-10 |
| Orton, 300 Orton Hall                        | 8-10 | 8-10 |
| Perkins Observatory (Delaware)               | 8:30 | 2    |
| Pharmacy, 207 Pharmacy Bldg.                 | 8-10 | 8-10 |
| Physics, 101 A. W. Smith Lab.                | 8-10 | 8-10 |
| Pomerene-Women's Physical Education, 307 Pomerene Hall | 8-10 | 8-10 |
| Social Work, 400 Stillman Hall               | 8-10 | 8-10 |
| Topaz, 114 Optometry Bldg.                   | 8-5  |      |
| Veterinary Medicine, 229 Sisson Hall         | 8-10 | 8-10 |

**November 25**

All libraries close at 5 p.m. except Health Center and Children's Hospital Libraries. Thanksgiving Day—All libraries closed.

**November 26**

**November 27-28**

**November 29**

**November 30**

**December 18**

**WINTER QUARTER 1971**

<table>
<thead>
<tr>
<th>December 25</th>
<th>Christmas Day—All libraries closed.</th>
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</thead>
<tbody>
<tr>
<td>January 1</td>
<td>New Year's Day—All libraries closed.</td>
</tr>
<tr>
<td>January 5</td>
<td>Begin Winter Quarter hours.</td>
</tr>
<tr>
<td>March 19</td>
<td>Begin Between-Quarter schedule at 5 p.m.</td>
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</tbody>
</table>

**SPRING QUARTER 1971**

<table>
<thead>
<tr>
<th>March 31</th>
<th>Begin Spring Quarter hours.</th>
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<tbody>
<tr>
<td>May 30-31</td>
<td>Memorial Day and Legal holiday observance. All libraries follow regular schedule. Begin Between-Quarter schedule at 5 p.m.</td>
</tr>
<tr>
<td>June 11</td>
<td>Begin Between-Quarter schedule at 5 p.m.</td>
</tr>
</tbody>
</table>

**SUMMER QUARTER 1971**

<table>
<thead>
<tr>
<th>June 22</th>
<th>Begin Summer Quarter hours. Independence Day—All libraries closed.</th>
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<tbody>
<tr>
<td>July 4</td>
<td>Begin Between-Quarter schedule at 5 p.m.</td>
</tr>
<tr>
<td>July 5</td>
<td>Begin Between-Quarter schedule at 5 p.m.</td>
</tr>
<tr>
<td>September 3</td>
<td>Begin Between-Quarter schedule at 5 p.m.</td>
</tr>
</tbody>
</table>
Course Fees

This Course Fees section lists courses for which additional fees are assessed. Under the appropriate department, the student will find the course number and the corresponding fee. An explanation of the special notes follows at the end of the section.

The course fee indicates an additional charge assessed for the course over and above the regular quarterly instructional fees charged. The fee must be paid along with the regular fees in order that registration for the course can be completed. No student will be permitted to engage in the course until this fee is paid.

The course fees listed are for the most part a simple dollar amount for the course for the quarter. However, it will be necessary in some cases to note that:

1. fees are assessed per credit hour
2. fees are assessed for various levels of students
3. Franz Theodore Stone Laboratory assesses one fee for yearly registration at the laboratory regardless of the courses taken.
<table>
<thead>
<tr>
<th>Course</th>
<th>Fee</th>
<th>Note</th>
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<tbody>
<tr>
<td>Agricultural Education</td>
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<td>Agricultural Engineering</td>
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*Accurate as of October 1, 1969.*
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All fees are subject to change without notice.

NOTES:
(1) For students registering for six hours only.
(2) Applies only when taught on the Columbus campus, and only when the student has registered for five credit hours. Summer Quarter, taught at Stone Laboratory for four credit hours. Yearly registration for Franz Theodore Stone Laboratory is $25.00 for all courses taken.
(3) Applies to all decimal subdivisions of this course except 527.26 and 527.27 which have fees of $35.00 and $50.00, respectively.
(4) For graduate students only and should be assessed only once per quarter regardless of the number of courses taken to which the fee applies.
(5) For Graduate students only; the fee for professional students is $5/cr. hr.
Committee on Institutional Cooperation

Member Institutions
University of Chicago
University of Illinois
Indiana University
University of Iowa
University of Michigan
Michigan State University
University of Minnesota
Northwestern University
Ohio State University
Purdue University
University of Wisconsin

Staff Offices
Purdue University
West Lafayette, Indiana 47907
Above left: Language Laboratory at Indiana University
Above right: Port of CIC student group enrolled in summer program in Mexico
Below: Noted physicist James A. Van Allen with students at University of Iowa, one of eleven institutions participating in the CIC Traveling Scholar Program for graduate students.
Pattern for Progress

The Committee on Institutional Cooperation (CIC) was established in 1958 by the presidents of the participating universities as a means of expanding opportunities in certain highly specialized areas of instruction, research, and public service.

The mechanism of interinstitutional cooperation helps in augmenting the general effort in higher education and in preventing unnecessary duplication in those areas where resources are scarce or extraordinarily costly.

The member institutions of the CIC are the Big Ten universities and the University of Chicago. The CIC is composed of high-level officials of these institutions acting as a board of representatives for consideration and evaluation of cooperative endeavors. A small staff is employed to effectuate CIC decisions and to assist groups interested in the development of cooperative projects.

In operative terms, the CIC is a faculty-oriented association; that is, the faculty members of the participating institutions are the source and initiators of many proposals for cooperative action. Suggestions for new activities may also originate with university administrative groups, the CIC and its staff, or with outside agencies such as foundations or government agencies. The CIC awaits such proposals and formally acts upon them only after they have been developed as project plans by faculty or administrative working groups. However, to facilitate interuniversity discussion of ideas during the developmental period, the CIC uses the mechanism of the “seed grant”—an allocation of a small sum of money to cover travel and other expenses involved in holding a meeting of an interinstitutional faculty group. The seed-grant resource provides an opportunity for exploratory discussion not readily available prior to adoption of the concept by the CIC. The program, made possible through funds awarded by the Carnegie Corporation of New York, has demonstrated that important cooperative projects can come from small beginnings, provided there is a catalyst available to assist in the process.

It should be noted that all projects are developed and conducted on a strictly voluntary basis. Participation in any CIC program is thus always on the highest feasible level of interest, there being no requirement that all eleven institutions must agree to participate before a program is launched. If one or more universities wish to forego participation in a particular project, this remains their prerogative while at the same time it does not deter the others from going ahead. This voluntary principle ensures that the status of each university as an independent and autonomous institution will in no way be diminished.

Projects and programs conducted by the CIC have gained the attention of educators and officials throughout this country and abroad. The CIC helps in this process of communication with educational and governmental groups by regularly issuing reports and newsletters describing current activities. In general, both in its substantive programs and its communications function, the CIC acts as an intermediary agency drawing on the resources of eleven major institutions of higher learning to identify areas in which there is potential for major innovation through cooperative action.

Unique Programs and Courses at Ohio State

Unique programs and courses are offered at the Ohio State University during the Summer Quarter, 1970, such as:

- Programs in Agronomy on Soil-Plant Relationships and on Soil Science for Science Teachers.
- Programs at the Biological Field Station at South Bass Island in Lake Erie on Aquatic Biology and on Biometeorology.
- A Linguistics Institute in the College of Humanities and the CIC Cooperative Summer Slavic Institute.
- The Fourth International Theater Research Tour Seminar to England and the Continent.

For unique programs and courses offered at the other CIC institutions, see the 1970-71 Summer Quarter catalog.
The Ohio State University
Columbus, Ohio, 43210, Telephone 293-3148 (Area Code 614).
Mail for specific members of the Board of Trustees and the Administration should carry the following general address:
The Ohio State University, 190 North Oval Drive, Columbus, Ohio 43210.
Administration offices are open Monday through Friday from 8 to 5 and Saturday from 8 to 12 noon.

Offices for Specific Information
Office of Admissions
102 Administration Building, 190 North Oval Drive
  Application Requests, Telephone 293-8412
  Undergraduate Admissions, Telephone 293-1431
  Graduate Admissions, Telephone 293-1531
  Professional Admissions, Telephone 293-1321
Office of the Bursar
200 Administration Building, 190 North Oval Drive, Telephone 293-2812
Office of Continuing Education
12 Brown Hall, 190 West 17th Avenue, Telephone 293-4209
Office of the Dean of the Graduate School
138 Graduate School Building, 164 West 19th Avenue, Telephone 293-6031
Office of the Vice President for Student Affairs
201 Administration Building, 190 North Oval Drive, Telephone 293-6344
Office of the Registrar
203 Administration Building, 190 North Oval Drive, Telephone 293-7941
Office of Student Financial Aids
200 Student Services Building, 154 West 12th Avenue, Telephone 293-6916
The material presented in this Academic Planning Guide is to aid the student and his adviser in planning the student's academic program for the coming year. Courses shown are those that will be offered each quarter during the academic year. The student will find listed the times at which courses are expected to be offered and the instructors who are expected to teach them.

This listing is not to be used by the student in scheduling classes for each quarter. Instead, a quarterly Master Schedule will be used in scheduling. The quarterly Master Schedule will be prepared and distributed, along with schedule cards, to all students prior to the beginning of each quarter.

For Autumn Quarter registration, the quarterly Master Schedule and schedule cards will be mailed to the home address of those students not attending classes during the Summer Quarter. For enrolled students, registration materials will be available in the student's college office on the following dates:

- Summer Quarter 1970: May 1, 1970
- Autumn Quarter 1970: July 31, 1970
- Winter Quarter 1971: November 2, 1970
- Spring Quarter 1971: February 1, 1971

Instructions for registering and registration deadlines will be included in the appropriate quarterly Master Schedule and supplemented by announcements appearing in the student newspaper, the Lantern.

Adviser Approval Forms are included at the end of this Academic Planning Guide to assist those students required to have an adviser's signed approval of courses scheduled. The student should use the Adviser Approval Form to obtain adviser approval of his Autumn Quarter schedule in advance of the summer vacation period. During Summer Quarter, when the student or his adviser may be away from campus, securing such approval could be difficult or impossible.

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- Columbus Campus: C-3
- Lima Campus: C-107
- Mansfield Campus: C-111
- Marion Campus: C-116
- Newark Campus: C-119
- Adviser Approval Forms: C-129
EXPLANATORY NOTES

The information listed in the Academic Planning Guide is organized in alphabetical order by department. Within each department listing are the course offerings for each quarter, Summer through Spring.

The course offering listings indicate by column:

Course Number (No.), Credit Hours (Crd't.), Section Descriptors (Sec), Course Meeting Days (Day), Time and Instructor if assigned. Class sections which meet during one normal class period (48-minute period starting on the hour or half-hour have only the starting time indicated.) Both the beginning and ending times are indicated for sections which either begin or end outside one normal class period. Classes meeting at 7 p.m. and after have a "pm" listed following the meeting time to distinguish them from a.m. classes When an uppercase letter follows the course number, it designates the specific topic offered in that course as listed in the Courses of Instruction section.

The following codes are used as section descriptors:

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<thead>
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<th>Code</th>
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<td>Field Trip</td>
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<tr>
<td>I</td>
<td>Individual Study/Research</td>
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<td>K</td>
<td>Clinical Experience</td>
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<td>L</td>
<td>Lecture</td>
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<tr>
<td>P</td>
<td>Practice/Rehearsal</td>
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<tr>
<td>R</td>
<td>Recitation</td>
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<tr>
<td>S</td>
<td>Seminar</td>
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<tr>
<td>W</td>
<td>Work Experience/Student Teaching</td>
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The codes listed below indicate any special scheduling restrictions that apply to a section. These codes, listed in the second and third column positions of the Section Descriptors (Sec.) when they apply, are as follows:

<table>
<thead>
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<th>Code</th>
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<td>11</td>
<td>Enrollment limited to Pharmacy students</td>
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<tr>
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<td>Enrollment limited to women only</td>
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<tr>
<td>13</td>
<td>Enrollment limited to men only</td>
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<tr>
<td>14</td>
<td>Enrollment limited to participants of institutes, workshops, and other special groups</td>
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The student is responsible for meeting all prerequisites for each course scheduled as specified in the Courses of Instruction. The Courses of Instruction section of this book should be consulted for each course being considered to ensure that the student will have met all of the required prerequisites for each course prior to scheduling. No attempt has been made to list course prerequisites in the Academic Planning Guide.
### Accounting

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**Please note:** The above information is extracted from a table in the image. It includes the following data:
- **Anesthesiology:** Schedule of classes and instructors for different semesters (Autumn and Spring).
- **Animal Science:** Similar schedule for different days and times.

The table structure includes columns for No., Craft. Sec., Day, Time, and Instructor.
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PLANNING GUIDE C-13

ARTS AND SCIENCES SURVEY COURSES

No. Crdt. Sec. Day Time Instructor

AUTUMN
H750 1 ARR
WINTER
H750 1 ARR
SPRING
608 S L MTWF 11 ARR LAROCQUE

ASTRONOMY

No. Crdt. Sec. Day Time Instructor

AUTUMN
150 S L MW 7-0915P
191 S L MT R 7-0915P
Astronomy (Cont’d)

WINTER

150  5  L  TR  7  -0915P
192  5  L  MW  7  -0915P

190  5  B  M  8  P
490  5  B  B  8  P

601  3  L  ARR
611  3  L  TR  11  -1230
651  4  L  TR  1  -02
693  1-15  C  L  TR  1  -1230
786  3  L  TR  3  -05
802  3  L  ARR
822  3  L  ARR
862  3  L  ARR
999  3  L  ARR

SPRING

150  5  L  MW  7  -0915P
192  5  L  MW  7  -0915P
301  3  B  M  TR  6  -11P
652  3  L  TR  1  -03
693  1-15  C  L  ARR
787  3  L  TR  1030-12
802  3  L  TR  3  -05
862  3  L  ARR
999  3  L  ARR

Aviation

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201  1  B  W  095P  0950P
211  4  B  MW  08  -10
401  1-4  B  MW  09
411  3  L  MW  10

WINTER

111  3  L  MW  10
201  4  L  MW  6

SPRING

201  1  B  MW  8
211  4  B  MW  8
401  1-4  B  MW  9
419  3  L  MW  9

Biology

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101  5  L  ARR

SPRING

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Biochemistry

No.  Cr’dt. Sec.  Day  Time  Instructor

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211  4  L  MW  9
221  6  L  MW  6
705  5  L  MW  8
710  5  B  MW  8
785  2-10 I  T  1
895  2  B  T  1
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| 620 | 4           | D   | MWF 9  | R           |
| 630 | 4           | D   | MWF 9  | R           |
|     | 640         | D   | MWF 9  | R           |
|     | 650         | D   | MWF 9  | R           |
|     | 660         | D   | MWF 9  | R           |
|     | 670         | D   | MWF 9  | R           |
|     | 693         | D   | MWF 9  | R           |
|     | 700         | D   | MWF 9  | R           |

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104  S  R  MTWRF  9  LYELL
105  S  R  MTWRF  9  CHING
501  S  L  MTWRF  10  CHING
502  S  L  MTWRF  10  CHING
503  S  L  MTWRF  10  CHING
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656  S  L  MTWRF  10  CHING
683  S  L  MTWRF  10  CHING
693  S  L  MTWRF  10  CHING
694  S  L  MTWRF  10  CHING

SPRING

Circulation Technology

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551  8  K  ARR
560  7  D  ARR
561  8  K  ARR
570  7  D  ARR
571  8  K  ARR

WINTER
400  5  L  ARR
401  6  D  ARR
402  5  L  ARR
550  7  D  ARR
551  8  K  ARR
560  7  D  ARR
561  8  K  ARR
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SPRING

City and Regional Planning

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794.06  5  SC  ARR
794.07  5  SC  ARR
794.08  5  SC  ARR
794.09  5  SC  ARR
794.10  5  SC  ARR
794.11  5  SC  ARR
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| 505 | 4 D M W F  | 8     |      | ARR        |
| 520 | 4 D M W F  | 8     |      | ARR        |
| 560 | 4 D M W F  | 10    |      | ARR        |
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| 693 | 3-5 C      | ARR |      | ARR        |
| 694 | 3-5 S      | ARR |      | ARR        |
| 400 | 3 D M W F  | 9     |      | ARR        |
| 520 | 4 D M W F  | 3     |      | ARR        |
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#### Spring

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| 260 | 5 D MTWF | 9     |      | ARR        |
| 220 | 5 L M W F | 8     |      | ARR        |
| 505 | 4 D M W F | 8     |      | ARR        |
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| 740 | 5 L M W F | 10    |      | ARR        |
| 800 | 3-5 S     | ARR |      | ARR        |
| 823 | 3-5 S     | ARR |      | ARR        |
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| 897 | 1-5 S     | ARR |      | ARR        |
| 983 | 5 S       | ARR |      | ARR        |
| 999 | 1         | ARR |      | ARR        |

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| 505 | 2-5 D     | M W F | 9     | PATTEN     |
| 512 | 4 D M W F | 9     |      | S. E. BROWN |
| 512 | 4 D M W F | 9     |      | LEVEREDGE  |
| 520 | 4 D M W F | 9     |      | TARRAF     |
| 580 | 5 D M W F | 2     |      | YOUNGMAN   |
| 620 | 5 D M W F | 2     |      | RAYNER     |
| 640 | 5 D M W F | 10    |      | LENTNEK    |
| 640 | 5 D M W F | 11    |      | GOLLEDGE   |
| 660 | 5 D M W F | 2     |      | L BROWN    |
| 670 | 5 D M W F | 11    |      | COX        |
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104 & 5 & R & MTWRF 1 & |
401 & 5 & R & HAYON & |
421 & 3 & LR & MWF 10 & |
694 & 1-5 LR & ARR & MASHIAH & |
794 & 1-15 I & MWF 11 & MASHIAH & |
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103 & 5 & R & MTWRF 12 & |
104 & 5 & R & MTWRF 2 & |
402 & 5 & R & HAYON & |
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694 & 1-15 LR & ARR & MASHIAH & |
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102 & 5 & R & MTWRF 10 & |
103 & 5 & R & MTWRF 12 & |
104 & 5 & R & MTWRF 2 & |
271 & 3 & LR & MWF 10 & |
604 & 3 & LR & MWF 9 & |
694 & 1-15 LR & ARR & MASHIAH & |
794 & 1-5 I & ARR & MASHIAH & |
794 & 1-10 I & ARR & MASHIAH & |

### History

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251 & 3 & L & MWF 10 & |
260 & 3 & L & MWF 10 & |
265 & 5 & L & MTWRF 1 & |
294 & 3-5 I & ARR & MASHIAH & |
602 & 3 & L & MWF 11 & |
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606 & 5 & L & MTWRF 2 & |
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746 5  L  MTRFW 1  ALBER
770 3  D  R  4  26  ZAHNISER
780 3  S  I  ARR
801 5  S  M  5  17  PETERS
805 5  S  W  3  25  PETER
814 3  S  T  4  26  CHAPIN
840 5  S  ARR  FULLNER
845 5  S  ARR  CHANG
850 5  S  ARR  ANKORI
863 3  S  ARR  ALBER
866 5  S  T  4  26  MILLER
867 5  S  R  7  25  DILLON
868 5  S  W  3  25  KERR
873 3  S  R  3  25  MILLER
880 1  S  ARR  BURNHAM
899 1  S  ARR  BURNHAM
999 1  I  ARR  BURNHAM

WINTER

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715 3  S  T  3  25  COPE
716 3  S  M  W  F  3  25
930 3  S  I  R  3  25  LUDDEN
932 3  S  I  R  3  25  PATTON
934 1  I  S  ARR
999 1  I  ARR

SUGGESTED EXCURSIONS

Barnes, PA

PISCES

111 3  L  M  W  F  8
715 3  S  T  3  25
716 3  S  M  W  F  3  25
930 3  S  I  R  3  25
932 3  S  I  R  3  25
934 1  I  S  ARR
999 1  I  ARR

MINER

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715 3  S  T  3  25
716 3  S  M  W  F  3  25
930 3  S  I  R  3  25
932 3  S  I  R  3  25
934 1  I  S  ARR
999 1  I  ARR

718 3  L  M  W  F  9
737 5  L  MTRFW 12  ROBEL
746 5  L  MTRFW 1  ALBER
770 3  D  R  4  26  ZAHNISER
780 3  S  I  ARR
801 5  S  M  5  17  PETERS
805 5  S  W  3  25  PETER
814 3  S  T  4  26  CHAPIN
840 5  S  ARR  FULLNER
845 5  S  ARR  CHANG
850 5  S  ARR  ANKORI
863 3  S  ARR  ALBER
866 5  S  T  4  26  MILLER
867 5  S  R  7  25  DILLON
868 5  S  W  3  25  KERR
873 3  S  R  3  25  MILLER
880 1  S  ARR  BURNHAM
899 1  S  ARR  BURNHAM
999 1  I  ARR

History of Art

No.  Craft. Sec.  Day  Time  Instructor

AUTUMN

111 3  L  M  W  F  8  ANKORI
737 5  L  MTRFW 12  ROBEL
746 5  L  MTRFW 1  ALBER
770 3  D  R  4  26  ZAHNISER
780 3  S  I  ARR
801 5  S  M  5  17  PETERS
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868 5  S  W  3  25  KERR
873 3  S  R  3  25  MILLER
880 1  S  ARR  BURNHAM
899 1  S  ARR  BURNHAM
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WINTER

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SUGGESTED EXCURSIONS

Barnes, PA

PISCES

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716 3  S  M  W  F  3  25
930 3  S  I  R  3  25
932 3  S  I  R  3  25
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MINER

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716 3  S  M  W  F  3  25
930 3  S  I  R  3  25
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### Pediatrics

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**C-60 PLANNING GUIDE**
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| 707.6 | 5 | L | MWF | 1 | ARR | RICHARDSON |
| 795.0 | 2-15 | I | ARR | CORNWELL |
| 810.6 | 1 | I | ARR | |
| 822.3 | 3 | L | ARR | BRIELEY |
| 828.3 | 3 | L | ARR | ALLEN |
| 850.1 | 1 | S | ARR | CORNWELL |
| 855.2 | 2 | S | ARR | |
| 909.0 | 1 | I | ARR | |

SOUTH

| 540.6 | 6 | L | F | 10 | DEVOR |
| 701.6 | 6 | L | MWF | 11 | ARR | DEVOR |
| 707.6 | 5 | C | T | 1 | 04 | |
| 795.0 | 2-15 | I | ARR | |
| 823.3 | 3 | L | ARR | |
| 825.1 | 1 | S | ARR | BRIELEY |
| 855.2 | 2 | S | ARR | |
| 895.0 | 1 | I | ARR | |

SPRING

| 613.3 | 3 | O | M | 1 | RIESKE |
| 701.6 | 6 | B | T | 2 | 05 | RIESKE |
| 709.5 | 5 | L | MWF | 8 | ARR | RICHARDS |
| 795.0 | 2-15 | I | ARR | CORNWELL |
| 855.2 | 2 | S | ARR | |
| 999.0 | 1 | S | ARR | |

PHYSIOLOGICAL OPTICS

**No.** | **Crd't. Sec.** | **Day** | **Time** | **Instructor**
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| 512 | 5 | L | MWF | 9 | ARR | 11 |
| 752 | 5 | L | MWF | 9 | ARR | 11 |
| 795 | 1-15 | C | 8 | 02 | |
| 801 | 5 | L | MTW | 1 | ARR | |
| 810 | 5 | L | ARR | |
| 812 | 5 | L | ARR | |
| 813 | 5 | L | ARR | |
| 999 | 1 | I | ARR | |

**WINTER**

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| 563 | 5 | L | MWF | 1 | ARR | |
| 614 | 3 | L | MWF | 1 | ARR | |
| 693 | 1-15 | C | 8 | 02 | |
| 716 | 5 | L | MWF | 3 | ARR | ESKRIDGE |
| 730 | 5 | L | MWF | 9 | ARR | |

**PHYSIOLOGY**

**No.** | **Crd't. Sec.** | **Day** | **Time** | **Instructor**
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**AUTUMN**

| 795 | 1-3 | S | R | 1 | -04 | SPARKMAN |
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| 808 | 5 | B | M | 7 | -09 | |
| 816.0 | 1 | ARR | |

**SPRING**

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| 607 | 5 | L | MWF | 6 | ARR | |
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| 999 | 1 | S | ARR | |

**WINTER**

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| 734 | 5 | L | MWF | 1 | RICHARDSON |
| 741 | 5 | L | MWF | 4 | WHY |
| 745 | 5 | L | MWF | 2 | AXLIN |
| 758 | 5 | L | MWF | 1 | LEVINSON |
| 766 | 5 | L | MWF | 2 | FLINN |
| 775 | 5 | L | MWF | 11 | AM | ARR |
| 778 | 5 | L | MWF | 1 | ARR |
| 791 | 5 | L | MWF | 9 | BURGESS |
| 801 | 5 | L | MWF | 3 | HARRISON |
| 807 | 3 | S | M | 3 | ANDREWS |
| 826 | 3 | S | S | 3 | SANI |
| 846 | 3 | S | S | 3 | SANI |
| 876 | 3 | S | T | 3 | ARR |

WINTER

| 100 | 5 | L | MWF | 8 | ARR |
| 103 | 5 | L | MWF | 10 | HARRISON |
| 104 | 5 | L | MWF | 1 | LEVINSON |
| 105 | 5 | L | MWF | 2 | LEVINSON |
| 106 | 5 | L | MWF | 3 | LEVINSON |
| 107 | 5 | L | MWF | 11 | LEVINSON |
| 225 | 5 | L | MWF | 11 | KETTLER |
| 245 | 5 | L | MWF | 11 | KETTLER |
| 265 | 5 | L | MWF | 11 | ERR |
| 269 | 5 | L | MWF | 11 | ERR |
| 303 | 5 | L | MWF | 1 | ANDREWS |
| 305 | 5 | L | MWF | 9 | LIDDEL |
| 345 | 5 | L | MWF | 9 | LIDDEL |
| 355 | 5 | L | MWF | 1 | HARRISON |
| 358 | 5 | L | MWF | 2 | KETTLER |
| 361 | 5 | L | MWF | 11 | LEVINSON |
| 373 | 3 | S | M | 3 | ANDREWS |
| 394 | 3 | S | S | 3 | SANI |
| 406 | 3 | S | S | 3 | SANI |
| 470 | 3 | S | T | 3 | ERR |

PORTUGUESE

No. Crdt. Sec. Day Time Instructor

AUTUMN

| 101 | 5 | R | MWF | 2 | ERR |
| 102 | 5 | R | MWF | 2 | ERR |
| 104 | 5 | R | MWF | 11 | ERR |
| 421 | 5 | LW | MWF | 10 | ERR |
| 620 | 5 | L | MWF | 11 | ERR |
| 694 | 1-15 | C | ERR |
| 993 | 1-15 | C | ERR |
| 994 | 1-15 | C | ERR |

WINTER

| 102 | 5 | R | MWF | 2 | ERR |
| 103 | 5 | R | MWF | 10 | ERR |
| 202 | 5 | R | MWF | 11 | ERR |
| 622 | 5 | L | MWF | 11 | ERR |
| 694 | 1-15 | C | ERR |
| 993 | 1-15 | C | ERR |
| 994 | 1-15 | C | ERR |

SPRING

| 101 | 5 | R | MWF | 11 | ERR |
| 103 | 5 | R | MWF | 2 | ERR |
| 201 | 5 | R | MWF | 10 | ERR |
| 221 | 3 | R | MWF | 10 | ERR |
| 694 | 1-15 | C | ERR |
| 993 | 1-15 | C | ERR |
| 994 | 1-15 | C | ERR |

Poultry Science

No. Crdt. Sec. Day Time Instructor

AUTUMN

| 200 | 5 | L | MTWF | 8 | ERR |
| 225 | 5 | L | MTWF | 11 | ERR |
| 245 | 5 | L | MTWF | 1 | ERR |

| 300 | 5 | L | MTWF | 11 | ERR |
| 325 | 5 | L | MTWF | 2 | ERR |
| 422 | 5 | L | MTWF | 12 | ERR |
| 505 | 5 | L | MTWF | 9 | ERR |
| 562 | 5 | L | MTWF | 10 | ERR |
| 610 | 5 | L | MTWF | 11 | ERR |
| 616 | 5 | L | MTWF | 2 | ERR |
| 627 | 5 | L | MTWF | 10 | ERR |
| 630 | 5 | L | MTWF | 9 | ERR |
| 650 | 5 | L | MTWF | 8 | ERR |
| 660 | 5 | L | MTWF | 7 | ERR |
| 672 | 5 | L | MTWF | 6 | ERR |
| 675 | 5 | L | MTWF | 5 | ERR |
| 676 | 5 | L | MTWF | 4 | ERR |
| 677 | 5 | L | MTWF | 3 | ERR |
| 678 | 5 | L | MTWF | 2 | ERR |
| 700 | 5 | L | MTWF | 1 | ERR |
### Preventive Medicine

**No.**  |  **Crd't. Sec.** |  **Day** |  **Time** |  **Instructor**
---|---|---|---|---

#### AUTUMN

| 595 | L | 5 | L | ARR | TOWNSEND |
| 735 | D | 5 | L | ARR | KELLER |
| 735 | 5 | 6 | A | ARR | KELLER |
| 763 | 1 | 6 | O | ARR | NICK |
| 764 | 3 | 6 | D | ARR | HESEND |
| **793.01** | 2+5 | 6+12 | BD | ARR | ELLINGDON |
| **793.02** | 2+5 | 6+12 | BD | ARR | BILLINGS |

#### SPRING

| 624 | 2 | 6 | D | W | ARR | KELLER |
| 735 | 6 | 6 | D | W | ARR | KELLER |
| **793.01** | 2+5 | 6+12 | BD | W | ARR | ELLINGDON |
| **793.02** | 2+5 | 6+12 | BD | W | ARR | BILLINGS |
| **793.03** | 2+5 | 6+12 | BD | W | ARR | BILLING |
| **793.04** | 2+5 | 6+12 | BD | W | ARR | BILLING |
| **793.05** | 2+5 | 6+12 | BD | W | ARR | BILLING |
| **793.06** | 2+5 | 6+12 | BD | W | ARR | BILLING |

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**Note:** The table above represents the schedule for Preventive Medicine courses offered in the given terms (AUTUMN and SPRING). Each row specifies the number of the course, the credit section, day of the week, time of the class, and the instructor. The classes are spread across different days and times, as indicated by the day and time columns. The instructors listed are TOWNSEND, KELLER, NICK, HESEND, ELLINGDON, BILLINGS, and possibly others not listed. The courses are scheduled to accommodate the requirements of the curriculum.
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- **Slavic Languages and Literatures (Cont'd):** Schedule for 993-999.
- **Social Work:** Schedule for Autumn and Spring.
- **Sociology:** Schedule for Autumn Only.
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**Notes:**
- SMRNB: ROYAL NAVY
- LB: LOWE
- WF: WILCO
- FJ: FOGG
- MATTELLING: WILCO
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**Winter**

- D MWF 5
- L MTWF 11

**Spring**

- D MWF 11
- L MTWF 3

**Autumn**

- D MWF 9
- L MTWF 5

**Summer**

- D MWF 3
- L MTWF 5

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**Details:**

- The document contains a table with various medical records and statistics.
- The table includes information about planning guide, surgery, and statistics.
- The statistics section has rows indicating different arrangements for different days and times.
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### Veterinary Anatomy

**No. Crdt. Sec. Day Time Instructor**

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- **110** 7 L MTWR 8 OIESEM
- **420** 4 L T R 1 -12 ANDRES
- **470** 4 L T R 1 -12 ANDRES
- **601** 2-5 L MT R 12 VENZKE
- **693** 2-5 B ARR OIESEM
- **901** 2-5 B ARR ANDRES
- **999** 2-5 I ARR VENZKE

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- **430** 4 L M W 8 ANDRES
- **505** 4 L M W 10 ANDRES
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- **700** 3 B ARR OIESEM
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- **SPRING**: Spring semester.
- **AUTUMN**: Autumn semester.
- **WINTER**: Winter semester.
- **SPRING**: Spring semester.
## LIMA CAMPUS

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255 5 L MTWRF 10

Music

No. Cr'dt. Sec. Day Time Instructor

AUTUMN
141 3 D M W F 11 ZIMMERMAN
143 3 L M W F 3 COLLMAN
191 1 I M W F 1 STAFF
199 1 I ARR
270 3 DB MTWRF 10

WINTER
141 3 D M W F 2 ZIMMERMAN
142 3 L M W F 3 COLLMAN
191 1 I M W F 1 STAFF
199 1 I ARR
271 2 D MTW F 10 ZIMMERMAN

SPRING
141 3 D M W F 11 ZIMMERMAN
191 1 I M W F 1 STAFF
199 1 I ARR
270 3 DB MTW F 3 ZIMMERMAN
370 3 DB MTWRF 10

Philosophy

No. Cr'dt. Sec. Day Time Instructor

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101 5 L M W F 5 -0730 SEITZ
130 5 L T R 5 -0730 SEITZ

WINTER
101 5 L T R 5 -0730 SEITZ
130 5 L T R 5 -0730 SEITZ

SPRING
101 5 L MTWRF 3 SEITZ
130 5 L MTWRF 11 SEITZ

Physics

No. Cr'dt. Sec. Day Time Instructor

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131 5 L MTWRF 5 -08 SEITZ

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Political Science

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225 5 LD T R 5 -0734

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Psychology

No. Cr'dt. Sec. Day Time Instructor

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WINTER
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No. Cr'dt. Sec. Day Time Instructor

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**Note:** The table above lists class sections offered in Autumn and Winter semesters for various subjects including Education, French, Geography, Geology, History, and English. The table includes information on days of the week, time slots, and instructors for each class section.
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102 Administration Building
190 North Oval Drive
Columbus, Ohio 43210

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