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UNIVERSITY CALENDAR

FIRST SUMMER SESSION 1979

May 21    Registration
May 22    Classes begin
June 27-28 Examinations

SECOND SUMMER SESSION 1979

July 5    Orientation, new students
July 6    Registration
July 7    Classes begin
July 21   Classes meet
August 4  Classes meet
August 8-9 Examinations
August 11 Graduation

FALL SEMESTER 1979

August 20-21 Orientation, new students
August 22    Registration, all students
August 23    Late registration
August 24    Classes begin regular schedule; late registration fee applies
August 30    Last day for registration; last day to add a subject
September 13 Last day to order diploma for midyear graduation
September 20 Last day to drop a subject without record
October 15   Preliminary reports due
October 31   Last day to drop a subject or withdraw from the University without receiving final grades
November 12-16 Preregistration
November 21  Thanksgiving holidays begin after last class
November 26  Classes resume
December 10  Examinations begin
December 20  Midyear graduation

SPRING SEMESTER 1980

January 7    Orientation, new students
January 8    Registration, all students
January 9    Late registration
January 10   Classes begin regular schedule; late registration fee applies
January 16   Last day for registration; last day to add a subject
January 30   Last day to order diploma for May graduation
February 6   Last day to drop a subject without record
March 3      Preliminary reports due
March 14     Last day to drop a subject or withdraw from the University without receiving final grades; spring holidays begin after last class
March 24  Classes resume
April  9  Honors and Awards Day; classes suspended at 12 noon
April 14-18 Preregistration
April 28  Examinations begin
May    9  Commencement

FIRST SUMMER SESSION 1980
May    19  Registration
      20  Classes begin
June 25-26 Examinations

SECOND SUMMER SESSION 1980
June 30  Orientation, new students
      1    Registration
      2    Classes begin
      4    Classes suspended
      12   Classes meet
      26   Classes meet
August 6-7 Examinations
 August 9  Graduation

FALL SEMESTER 1980
August 18-19 Orientation, new students
       20  Registration, all students
       21  Late registration
       22  Classes begin regular schedule; late registration fee applies
       28  Last day for registration; last day to add a subject
 September 11  Last day to order diploma for midyear graduation
           18  Last day to drop a subject without record
       October 13  Preliminary reports due
           29  Last day to drop a subject or withdraw from the University without receiving final grades
     November 4  Election day; classes suspended
           10-14 Preregistration
           26  Thanksgiving holidays begin after last class
       December 1  Classes resume
           8    Examinations begin
           18  Midyear graduation

SPRING SEMESTER 1981
January  5  Orientation, new students
       6    Registration, all students
       7    Late registration
       8    Classes begin regular schedule; late registration fee applies
       14  Last day for registration; last day to add a subject
       28  Last day to order diploma for May graduation
       February 4   Last day to drop a subject without record
             March 2   Preliminary reports due
             March 13  Last day to drop a subject or withdraw from the University without receiving final grades; spring holidays begin after last class
           April 8  Honors and Awards Day; classes suspended at noon
April 13-17  Preregistration
April 27    Examinations begin
May 8      Commencement

FIRST SUMMER SESSION 1981
May 18    Registration
May 19    Classes begin
June 24-25 Examinations

SECOND SUMMER SESSION 1981
June 29   Orientation, new students
June 30   Registration
July 1    Classes begin
July 25   Classes meet
August 5-6 Examinations
August 8  Graduation
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Victor Hurst, PhD, *Vice President for Academic Affairs and Dean of the University*
Joseph B. McDevitt, JD, *Vice President for Executive Affairs and University Counsel*
Stanley G. Nicholas, BS, *Vice President for Development*

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Joseph B. McDevitt, JD, *Vice President for Executive Affairs and Secretary of the Board of Trustees*
Elmer N. Tyndall, MBA, *Assistant to the President*
Elsie B. Wilson, *Administrative Assistant and Secretary to the President*
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Farrell Blenn Brown, PhD, Associate Dean, Graduate Studies
Robert Walter Henningson, PhD, Associate Dean, University Research
George David Alexander, MS, Director, Division of Administrative Programming Services
John Charles Peck, PhD, Director, Division of Information Systems Development
Christopher John Duckenfield, PhD, Director, University Computer Center

Undergraduate Studies
Jerome Vincent Reel, Jr., PhD, Acting Dean, Undergraduate Studies
John Wallace Gordon Gourlay, AMLS, Director of the Library

University Extension
Samuel Marsh Willis, PhD, Dean, University Extension

Colleges

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Willie Cecil Godley, PhD, Associate Dean; Director, Agricultural Experiment Station
Stephen Richard Chapman, PhD, Associate Dean; Director of Instruction
Absalom West Snell, PhD, PE, Associate Director, Agricultural Experiment Station
Wayne Talmadge O'Dell, PhD, Associate Dean; Director, Cooperative Extension Service
Jimmy Bryant Copeland, PhD, Associate Director, Cooperative Extension Service
George Robert von Tungeln, PhD, Assistant to the Dean—International Programs; Coordinator, Special Instructional Programs
Jesse Edwin Faris, PhD, Head, Department of Agricultural Economics and Rural Sociology
Earl Thomas Carpenter, EdD, Head, Department of Agricultural Education
Byron Kenneth Webb, PhD, PE, Head, Department of Agricultural Engineering
Garnet Roy Craddock, PhD, Head, Department of Agronomy and Soils
Richard Ferman Wheeler, PhD, Head, Department of Animal Science
James Harold Martin, PhD, Head, Department of Dairy Science
Sidney Brooks Hays, PhD, Head, Department of Entomology and Economic Zoology
Woodie Prentiss Williams, Jr., PhD, Head, Department of Food Science
Taze Leonard Senn, PhD, Head, Department of Horticulture
Ottie Joseph Dickerson, PhD, Head, Department of Plant Pathology and Physiology
Bobby Dale Barnett, PhD, Head, Department of Poultry Science

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James Edward Dalton, MArch, Assistant to the Dean
Gayland Brooks Witherspoon, MSArch, Head, Department of Architectural Studies
Ralph Edward Knowland, MBA, Head, Department of Building Science
John Thomson Acorn, MBA, Head, Department of History and Visual Studies
Edward Lockwood Falk, DPA, Acting Head, Department of Planning Studies
COLLEGE OF EDUCATION
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Edwin Francis Rumsey, MPS, Col., USAF, Head, Department of Aerospace Studies
Earl Thomas Carpenter, EdD, Head, Department of Agricultural Education
Ernest Joseph Kozma, EdD, Head, Department of Elementary and Secondary Education
Alfred Franklin Newton, EdD, Head, Department of Industrial Education
Thomas Archibald, MBA, Lt. Col., USA, Head, Department of Military Science
Dove Henry Pate, Jr., EdD, Director, Office of Educational Services
Arthur Kenneth Jensen, PhD, Director, Vocational Education Media Center

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James Leon Edwards, MS, PE, Assistant to the Dean
Bobby Eugene Gilliland, PhD, PE, Assistant to the Dean
Byron Kenneth Webb, PhD, PE, Head, Department of Agricultural Engineering
Gilbert Chase Robinson, ScD, PE, Head, Department of Ceramic Engineering
William Berdell Barlage, Jr., PhD, Head, Department of Chemical Engineering
Herbert William Busching, PhD, Head, Department of Civil Engineering
Albert Link Duke, PhD, Head, Department of Electrical and Computer Engineering
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Thomas Michael Keinath, PhD, Head, Department of Environmental Systems Engineering
Francis Walter Cooke, PhD, Head, Department of Interdisciplinary Studies
Eugene Harlan Bishop, PhD, Head, Department of Mechanical Engineering
James Karl Johnson, Jr., MS, PE, Director, Continuing Engineering Education

COLLEGE OF FOREST AND RECREATION RESOURCES
Benton Holcomb Box, DF, Dean
Herbert Brantley, PhD, Associate Dean; Head, Department of Recreation and Park Administration
Robert Max Allen, PhD, Head, Department of Forestry

COLLEGE OF INDUSTRIAL MANAGEMENT AND TEXTILE SCIENCE
Wallace Dabney Trevillion, PhD, Dean
Thomas Daniel Efland, MS, Associate Dean, Director of Research
Cecil Cook Davis, MBA, CPA, Head, Department of Accounting and Finance
Rex Lee Cottle, PhD, Head, Department of Economics
Boyd Joseph Todd, PhD, Head, Department of Industrial Management
Edward Allen Vaughn, PhD, Head, Department of Textiles
Ralph Delano Elliott, PhD, Director, Professional Development
Harold Betts Wilson, BS, Field Representative

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Ronald Wesson Moran, PhD, Head, Department of English
Alan Schaffer, PhD, Head, Department of History
Harry Eugene Stewart, PhD, Head, Department of Languages
John Harrison Butler, EdD, Head, Department of Music
Charles Wythe Dunn, PhD, Head, Department of Political Science
John Douglas Davenport, PhD, Head, Department of Psychology
Richard Francis Larson, PhD, Head, Department of Sociology

COLLEGE OF NURSING
Geraldine Labecki, EdD, Dean; Acting Director, Graduate Degree Program in Nursing
Leon Roswal, MS, Director, Associate Degree Program in Nursing
Judith Joyce Chodil, PhD, Director, Continuing Education in Nursing
Gloria Ann Tanner, EdD, Director, Nursing Research
Mary Jean Wilhite, EdD, Director, Baccalaureate Degree Program in Nursing

COLLEGE OF SCIENCES
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Jessup MacLean Shively, PhD, Head, Department of Biochemistry
Charles Ronald Dillon, PhD, Head, Department of Botany
Rudolph Abraham Abramovitch, PhD, Head, Department of Chemistry and Geology
Albert Joseph Turner, Jr., PhD, Head, Department of Computer Science
John David Fulton, PhD, Head, Department of Mathematical Sciences
Malcolm James Benjamin Paynter, PhD, Head, Department of Microbiology
John Philip McKelvey, PhD, Head, Department of Physics and Astronomy
Carl Wilbert Helms, PhD, Head, Department of Zoology
Clemson is a land-grant, state-supported university, fully accredited by the Southern Association of Colleges and Schools. Curricula are accredited by Accreditation Board for Engineering and Technology, American Assembly of Collegiate Schools of Business, National Architectural Accrediting Board, National Council for Accreditation of Teacher Education, National League for Nursing, and Society of American Foresters.

The seventy-six undergraduate curricula and fifty-four graduate degree programs under the colleges of Agricultural Sciences, Architecture, Education, Engineering, Forest and Recreation Resources, Industrial Management and Textile Science, Liberal Arts, Nursing, Sciences, and the Graduate School form a background of training for the hundreds of occupations and professions in which Clemson graduates engage. The University is organized on a basis whereby it retains a clear entity through the interrelationships of colleges and departments providing a well-balanced fundamental and general educational program.

The enrollment of Clemson has grown from 446 students at the opening of the University in 1893 to 11,748 for the first semester, 1979-1980. Since the opening of the University, through the first semester, 1979-1980, 88,113 students have attended Clemson, and of this number, 35,127 have been awarded the bachelor's degree. During this same period 351 associate degrees, 6,808 master's degrees, 551 Doctor of Philosophy degrees, and 70 Education Specialist degrees have been awarded.

**ADMINISTRATIVE ORGANIZATION**

The government of the University is vested in a Board of thirteen members, including six elected by the Legislature and seven life and self-perpetuating members, in accord with the Clemson will. The President of the University is the chief executive and administrative officer elected by the Board of Trustees; and under the President there are five areas of administration, each headed by a chief administrative officer responsible to the President. The organizational units under each of these officers are outlined as follows:
I. Vice President for Academic Affairs and Dean of the University
   A. Undergraduate Studies
      1. Summer Sessions
      2. University Library
   B. Graduate Studies and University Research
      1. Computer Center
      2. Division of Administrative Programming Services
      3. Division of Information Systems Development
      4. Graduate School
      5. Office of University Research
   C. University Extension
   D. Colleges
      1. Agricultural Sciences
      2. Architecture
      3. Education
      4. Engineering
      5. Forest and Recreation Resources
      6. Industrial Management and Textile Science
      7. Liberal Arts
      8. Nursing
      9. Sciences
   E. Institutes
      1. The Belle W. Baruch Forest Science Institute
      2. Housing Institute
      3. Water Resources Research Institute
II. Vice President for Business and Finance
   A. Budgets and Systems
   B. Facilitating Services
   C. Financial Management
   D. Internal Audit
   E. Physical Plant
   F. Public Safety
   G. Special Projects and Planning Coordination
III. Vice President for Development
   A. Alumni Relations
   B. Campus Master Plan
   C. Communications Center
   D. Deferred Gifts and Estate Planning
   E. Planning and Corporate Relations
   F. University Relations
IV. Vice President for Executive Affairs and Secretary of the Board of Trustees
   A. University Counsel
V. Vice President for Student Affairs and Dean of Students
   A. Athletic Department
   B. Career Services
   C. Clemson University Union
   D. Counseling Center
   E. Housing Office
REQUIREMENTS FOR ADMISSION

Beginning Freshmen  To receive consideration for admission to Clemson, the applicant must present a transcript of his high school record and have an official copy of his Scholastic Aptitude Test scores sent directly from the College Board Office in Princeton, New Jersey.

The examination scores, along with the student's academic preparation, rank in class, and recommendation of the high school counselor will be weighed carefully in the admissions decision process. The applicant's acceptance will be confirmed upon presentation of a final high school transcript indicating a continuation of progress and graduation.

In addition, a student who has not received or does not intend to receive a high school diploma may qualify for entrance by:

1. Achieving satisfactory scores on the College Board examinations and by presenting a high school certificate (awarded by certificate examination) from the state in which he resides. This provision applies only to candidates 19 or more years of age.

2. Demonstrating unusual academic ability as an applicant who does not intend to graduate from high school. In special cases consideration may be given to younger candidates who possess superior high school records and whose College Board scores are above average for the freshman class. The typical student admitted under this provision ranks in the upper tenth of his class and has SAT scores which total 1100 or more.

Transfer Candidates  Entrance examinations are required of many transfer students, but a number may omit this step. Details regarding these requirements are outlined in the subsection dealing with entrance examinations.

All transfer applicants must have an original transcript of their records sent to Clemson directly from each college or university attended. Also, unless so stated on the transcript, the candidate will need to present statements of honorable dismissal and of eligibility to return to the institution last attended.

Applicants meeting the requirements outlined above will be considered carefully with regard to the quality of their credentials. If accepted, work completed at other institutions with a grade of C or higher may be evaluated for transfer in terms of equivalent courses
in the Clemson curriculum of one’s choice. Those who desire an admissions decision prior to completing a year of full-time study at an accredited college must also submit a high school transcript.

**Nursing Applicants** The award of advanced standing for accepted transfer students is a joint decision by personnel in the Registrar’s Office and faculty members in the college concerned. The College of Nursing requires that all students complete the courses as identified in the first two years of the curriculum as found in the College of Nursing section of this catalog. These are foundational for junior-year nursing courses. Students who wish to enroll in the courses in nursing offered during the second semester of the sophomore year must have completed all courses indicated prior to that semester. Adjustments may be made through summer session study, and the faculty adviser will assist in that programming. In most cases, it is possible for the student to delay these courses until the first summer session, thereby allowing more time to make up the needed prerequisites. In no case, however, will the student be allowed to enroll in nursing courses numbered 300 or above without the above nursing courses and all of the courses identified for freshman and sophomore years. Applicants should submit transcripts, including courses to be completed, in order for the College of Nursing to evaluate the applicant’s status. In this way, if the applicant does not meet the above requirements and additional sessions of study are required, the applicant would have an opportunity to determine a course of action before having to make a nonrefundable deposit.

Evaluation personnel in the Registrar’s Office are notified at the time a transfer student is accepted for the College of Nursing, and initial coordination begins at that point. Different advisers in the College of Nursing are assigned to those who are transferring from other bachelor degree programs and those who have completed a two- or three-year program in technical nursing. Therefore, when communicating with the College of Nursing, one should clearly point out his/her previous preparation in nursing.

**All Applicants** Various nonintellective factors will be considered in a few cases where it is impossible to make a positive decision on the basis of SAT scores and previous academic performance alone.

**Application Forms and Dates** Forms to be used in applying for admission to the University may be obtained by writing to the Office of Admissions, Clemson University, Clemson, South Carolina 29631. Applications for entrance in 1981 may be submitted beginning September 1980. There is no fixed cutoff date for submitting or completing an application. However, if one also wants residence halls accommodations, early application is a necessity. The experience of recent years suggests that the pool of applicants desiring dormitories may close by mid-October. The time of application does
not specifically control the time one receives a decision; however, the majority of admissions decisions are reached during the period November through March.

**Application Fee** Candidates must submit a nonrefundable fee of $15 with their applications. This fee is not applicable toward tuition and/or other University fees.

**Entrance Examinations** All freshman candidates and many transfer students must submit scores for the College Board Scholastic Aptitude Test (SAT). A student transferring from an accredited college usually need not submit SAT scores if he has earned thirty or more transferable semester hours with at least a C+ average (based on a system using four passing grades). Those enrolled in technical programs at technical and community colleges usually will be required to submit SAT scores.

For August enrollment, one must complete the SAT no later than the preceding November if dormitory accommodations are desired. Candidates who have completed the required tests previously may have their scores reported to Clemson by directing a request to the College Board together with a fee of $3. Others may secure a *College Board Student Bulletin* and an application for the tests from their local high school or from the Board’s Office, P.O. Box 592, Princeton, New Jersey 08541. *Copies of student reports and those submitted by third parties, such as high schools and colleges, are not acceptable.*

Although almost all freshmen must take at least one College Board Achievement Test, as explained in the next section, those attending high schools which do not compute class rank definitely should take three tests (English, Mathematics II, and one other of their choice). These students must take them by January of their senior year, as the scores will be used in reaching an admissions decision in such cases.

**Achievement Tests** Almost all freshmen will find that one or more of the College Board Achievement Tests are required or at least highly desirable for placement purposes. Since a candidate can take one, two, or three tests at the same administration without an increase in the test fee, all are encouraged to sit for three tests. The information provided by these results becomes an extra credential that may enhance the chance for acceptance, especially if one has made marked academic improvement in the last year or two of high school or if in the lower portion of a selective class. Specific requirements or recommendations are as follows:

*Mathematics* Candidates whose majors include Mathematical Sciences 101, 102, or 106 in the first semester freshman curriculum should take the College Board Achievement Test in Mathematics (Level II) unless automatic placement in a review course is desired. This review course does not count toward graduation.
**Foreign Language** Applicants who will have completed two or more years of high school French, German, Latin, Russian, or Spanish and who will enroll in a curriculum which includes a foreign language should take the appropriate language achievement test. These candidates may qualify for advanced placement with credit on the basis of a satisfactory score on this test.

**English** Test results in English might provide one with an alternate means of gaining advanced placement, as explained below, or serve as an extra credential for the candidate with marginal credentials.

**Other Tests** Students taking only two of the tests noted above are encouraged to take another one in a subject of their choice.

**Advanced Placement by Examination** In addition to earning credit by the usual method involving classroom attendance, students may receive credit toward their degrees by completing a course successfully by examination only. The following examination programs are currently recognized:

- **College Board Advanced Placement (AP)** High school students interested in exempting some of the elementary courses are encouraged to participate in the AP Programs at their high schools and have examination results sent to Clemson. Generally, credit for the full year’s course is awarded to those who earn a 3, 4, or 5 on the College Board AP examination(s).

- **English Departmental Examination** The English Department offers a locally administered writing sample to students with scores of 600 and above on the verbal section of the Scholastic Aptitude Test or 650 and greater on the College Board English Achievement Test. Students qualifying will receive written invitations to take the writing sample at one of the orientation sessions in the summer. Generally, credit for the first semester freshman composition course is awarded for demonstrated proficiency.

- **College Board College-Level Examination Program (CLEP)** A few departments accept credit for CLEP subject-matter examinations. Credit is awarded for introductory-level courses according to criteria established by the following departments: Chemistry, Economics, English (composition only), Psychology, and Mathematical Sciences (algebra and trigonometry only—applicable principally in agricultural curricula requiring MTHSC 105). Through CLEP the typically mature student has an opportunity to obtain credit by examination for adult or correspondence coursework or other nontraditional study. Further information regarding specific tests offered, registration procedures, and costs can be obtained from the University Counseling Center.

**Campus Visits** Prospective students are welcome to visit the Clemson campus and talk with the staff, faculty, and students of the University. Individually conducted tours are offered on most Monday
and Friday afternoons. Appointments are necessary and may be made through the Alumni Center.

Visits can be made to the Admissions Office without an appointment during regular office hours Monday through Friday, 8:00 a.m. to 4:30 p.m. It is best, however, to avoid visiting the campus during the last two weeks of August and the first week of January as these are class registration periods. The staff and faculty cannot always assist visitors at these times.

Candidates for the College of Architecture are particularly encouraged to come for an interview. Prospective students will have an opportunity to discuss the programs offered with a faculty member and tour the facilities. Appointments should be made in advance by contacting that College.

Interviews are not required in considering candidates, nor will the results of interviews affect admissions decisions. Rather, the purpose is to provide candidates the opportunity to learn more about the University, the programs, and admissions procedures.

**Orientation Program** The University has scheduled a series of two-day orientation programs during the summer months for entering freshmen, transfer students, and their parents. All accepted students are expected to attend one of these sessions.

During orientation students will have an opportunity to discuss their educational objectives with an adviser, to preregister for the fall semester, and to learn about student life. Transfer students have their transcripts evaluated and select appropriate courses for their first semester at Clemson. Those transferring may find it difficult to schedule the appropriate courses if they fail to attend one of the first six orientation periods. The dates for orientation in 1980 are as follows:

| June 16, 17 | July 10, 11 |
| June 19, 20 | July 14, 15 |
| June 30, July 1 | August 18, 19 |
| July 7, 8 |

**Students from other Countries** A limited number of well-qualified students from other countries are accepted. The first step is to file a preliminary application and take the Scholastic Aptitude Test (SAT) of the College Board. After one's scores are reported to Clemson, admissions personnel will make a preliminary evaluation and, if appropriate, send a formal application to the candidate. The student should enclose certified true copies of transcripts of secondary school and college-level records when returning the application.

*The program on these dates is an incomplete one, and it is especially inappropriate for transfer students. Only foreign students and American students living great distances from the University should defer orientation until this time.*
ADMISSION OF POST-BACCALAUREATE STUDENTS

A student may be accepted by the Graduate School as a post-baccalaureate student if he or she applies to a specific graduate degree program but does not have the appropriate academic background. Such a student must be recommended by the appropriate department or program chairperson and must fully meet all other requirements for admission to the particular degree program with respect to grade-point ratio and standardized test scores. A student in this category who is denied admission because of failure to meet the minimum requirements has access to the same appeal procedures as does any other student applying to the Graduate School.

Applicants will be classified as post-baccalaureate students if they are not qualified to take at least one graduate course per semester which can be included in the minimum hours required for the graduate degree. Additionally, any student required to complete more than eighteen semester hours of undergraduate credits will be classified as post-baccalaureate. Until such time that the required number of undergraduate credit hours is less than or equal to eighteen and the student is qualified to take, each semester, a graduate course which can be included in the minimum hours required for the graduate degree, he or she will remain classified as post-baccalaureate. A department or a student may request post-baccalaureate status even though the above criteria are satisfied.

At the time a post-baccalaureate student becomes eligible for classification as a graduate student, the decision as to eventual admission status (full or provisional) will be made according to criteria utilized by the department and Graduate School for all other applicants to the particular degree program. The post-baccalaureate student is expected to maintain a B average and receive no grade lower than C in order to qualify for admission to a graduate program.

Post-baccalaureate students may enroll in the same number of credits per semester as any undergraduate student but shall not enroll in graduate courses or receive a graduate assistantship. No degree or certificate shall be awarded to students in a post-baccalaureate status and such students who subsequently desire to obtain an additional baccalaureate degree must apply through the Office of Admissions and Registration. The applicability of credits earned toward the undergraduate degree will be determined by the policy pertaining to transfer students. Tuition and fees for post-baccalaureate students shall be those applicable to undergraduates with the exception of the application fee and admissions deposit.

A student possessing an undergraduate degree or a graduate degree and who wishes to enroll in specific undergraduate courses for reasons other than future admission to the Graduate School shall not be classified as post-baccalaureate and shall be governed by policies established by the Office of Admissions and Registration.
GRADUATE STUDY

Programs leading to graduate degrees from Clemson University are available in nine colleges—Agricultural Sciences, Architecture, Education, Engineering, Forest and Recreation Resources, Industrial Management and Textile Science, Liberal Arts, Nursing, and Sciences.

For information concerning advanced degrees see The Graduate School Announcements which may be obtained from the Office of the Dean of Graduate Studies and University Research.

EXPENSES

Establishment of University Fees  The annual State Appropriation Act imposes the general requirement that student fees be fixed by the University Board of Trustees. The Act imposes two specific requirements on the Board: (1) In fixing fees applicable to academic and general maintenance and operation costs, the Board must maintain a minimum student fee not less than the fee charged the previous year. (2) In fixing fees applicable to dormitory rental, dining halls, laundry, infirmary, and all other personal subsistence expenses, the Board must charge students an amount sufficient to fully cover the cost of providing such facilities and services.

Settlement of University Fees  The Schedule of Semester Charges for all undergraduate students—full- or part-time, and auditing—is shown on the pages which follow. Satisfactory settlement of all expenses is a requirement for completing each semester’s class registration, and no student is officially enrolled until all past due accounts have been satisfied. In special cases the University will accept, at the beginning of a semester, a noninterest bearing promissory note for a portion of the semester residence-hall rent and semester-plan board fee. Amounts up to $130 for room rent and $150 for board fee may be included in the note. In such cases, a note for the first semester charges will be due October 1, and a note for the second semester charges will be due March 1.

A $75 advance payment of room rent is required for a room reservation for the fall semester. Currently enrolled students who expect to continue enrollment are given an opportunity to make room reservations and pay the $75 during the spring semester at a time designated by the Housing Office. New students who desire residence hall accommodations are to pay the $75 advance payment of room rent and the $80 admissions deposit when they accept the University’s offer of admission. The $75 advance payment of room rent and the $80 admissions deposit are deducted from the amount otherwise due for the first semester expenses.
All checks and money orders should be made payable to Clemson University. A personal check given in payment of University expenses which is returned unpaid by the bank immediately creates an indebtedness to the University.

**SCHEDULE OF SEMESTER CHARGES 1980-81**

Actual charges are not known when the catalog is printed; consequently these tentative estimates are subject to change as conditions warrant.

<table>
<thead>
<tr>
<th></th>
<th>Full-Time Resident</th>
<th>Full-Time Nonresident</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tuition</strong></td>
<td>$75.00</td>
<td>$200.00</td>
</tr>
<tr>
<td><strong>Matriculation Fee</strong></td>
<td>5.00</td>
<td>5.00</td>
</tr>
<tr>
<td><strong>University Fee</strong></td>
<td>470.00</td>
<td>984.00</td>
</tr>
<tr>
<td><strong>Medical Fee</strong></td>
<td>55.00</td>
<td>55.00</td>
</tr>
<tr>
<td><strong>Semester Total</strong></td>
<td>$605.00</td>
<td>$1,244.00</td>
</tr>
<tr>
<td>(Excluding Room and Board)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Residence Halls**

- Johnstone (Sections A, B, C, D, E, F) $305.00
- Benet, Bowen, Bradley, Cope, Donaldson, Geer, Johnstone (Annexes A, F), Norris, Sanders, Wannamaker, Young $315.00
- Barnett, Byrnes, Lever, Manning, Mauldin, Smith $335.00
- Clemson House
  - Room (two occupants) $335.00
  - Apartment with kitchenette (three or four occupants) $355.00

**Board**

- Five-Day Plan (Monday through Friday) $330.00
- Seven-Day Plan (Monday through Sunday) $385.00

**Part-time Student** Undergraduate and graduate students taking less than 12 semester credit hours will be charged each semester according to the following schedule. These fees do not provide for admission to athletic events, concert series, and other such activities.

<table>
<thead>
<tr>
<th></th>
<th>S. C. Resident</th>
<th>Nonresident</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Matriculation Fee</strong></td>
<td>$5.00</td>
<td>$5.00</td>
</tr>
<tr>
<td><strong>Tuition</strong></td>
<td>$6.00</td>
<td>$16.00</td>
</tr>
<tr>
<td><strong>University Fee</strong></td>
<td>$38.00</td>
<td>$78.00</td>
</tr>
</tbody>
</table>

**Auditing** Charges for auditing are made each semester according to the following schedule:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tuition</strong></td>
<td>$3.00</td>
<td>$8.00</td>
</tr>
<tr>
<td><strong>University Fee</strong></td>
<td>$19.00</td>
<td>$39.00</td>
</tr>
</tbody>
</table>

*Note: For assessing fees, MTHSC 100 is the equivalent of five semester hours.*
Past Due Accounts  Any indebtedness to the University which becomes past due immediately jeopardizes the student's enrollment, and no such student will be permitted to re-enroll for an ensuing semester or summer school term. Further, any student who fails to pay all indebtedness to the University may not be issued a transcript or diploma.

Refund of Academic Fees for Students Enrolled for Less than a Full Semester  No adjustments in charges will be made on a semester's tuition and fees after five weeks from the date classes begin for the semester. Charges for periods of attendance of five weeks or less during a semester shall be made on the following basis:

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two weeks or less</td>
<td>20%</td>
</tr>
<tr>
<td>More than 2 but not more than 3 weeks</td>
<td>40%</td>
</tr>
<tr>
<td>More than 3 but not more than 4 weeks</td>
<td>60%</td>
</tr>
<tr>
<td>More than 4 but not more than 5 weeks</td>
<td>80%</td>
</tr>
<tr>
<td>More than 5 weeks</td>
<td>100%</td>
</tr>
</tbody>
</table>

Refund of Dining Hall and Residence Hall Fees  Specific information relating to living-expense refunds is given in the sections on Housing and Student Food Service.

Late Registration Service Charge  Registration for classes is scheduled for specific days, and certain definite procedures are outlined to prevent or reduce the problems incident to late registration. A student has not completed registration until all required steps have been taken, the final being the return of the registration form, and if not preregistered for classes the properly signed class registration card to the Office of Admissions and Registration. Any student failing to complete registration on the specified class registration days will incur a service charge of $10.

Books and Supplies  The cost of books is not included in the Schedule of Semester Charges. Books and supplies at the beginning of the semester will be approximately $120, except for students enrolling in architecture the cost will be approximately $145.

Optional Expenses  It is not possible to give an estimate of a student's expenditures for such amusements as dancing, motion pictures, and others. This depends largely upon the disposition of the student. The University endeavors to reduce to a minimum the temptation to spend money needlessly, but the authorities cannot be responsible for a student's private expenditures. This must be a matter between the student and his parents.

Transcripts  Requests for transcripts should be directed to the Office of Admissions and Registration. The initial transcript is issued gratis. Thereafter, a minimum fee of $3 is charged for a single copy.
A charge of 50 cents will be made for each additional copy on the same order.

**Student Depository** For the convenience of students, the University operates a depository in the Bursar's Office where money can be deposited and withdrawn as the occasion may demand. This service is purely local. Students are urged to deposit their money and not to keep it in their rooms.

**RESIDENT TUITION AND FEES**

**Entitlement**—Eligibility or payment of instate tuition and fees shall be determined under the provisions of Section 59-101-70, South Carolina Code of Laws, 1976, as amended (Act No. 466). This law is set forth in its entirety as follows (subject to further amendment by the General Assembly).

**Definitions**—Section 1. As used in this act:

A. The words "State Institution" shall mean those post-secondary educational institutions under the jurisdiction of the following: (1) Board of Trustees, Clemson University; (2) Board of Trustees, Medical University of South Carolina; (3) Board of Trustees, South Carolina State College; (4) State College Board of Trustees; (5) Board of Visitors, The Citadel; (6) Board of Trustees, University of South Carolina; (7) Board of Trustees, Winthrop College; and (8) State Board of Technical and Comprehensive Education.

B. The word "student" shall mean any person enrolled for studies in any State Institution.

C. The word "residence" or "reside" shall mean continuous and permanent physical presence within this State, provided, that temporary absences for short periods of time shall not affect the establishment of a residence.

D. The word "domicile" shall mean a person's true, fixed, principal residence and place of habitation; it shall indicate the place where such person intends to remain, and to which such person expects to return upon leaving without establishing a new domicile in another state. For purposes of this section one may have only one legal domicile; one is presumed to abandon automatically an old domicile upon establishing a new one. Housing provided on an academic session basis for students at State Institutions shall be presumed not to be a place of principal residence, as residency in such housing is by nature temporary.

E. The words "in-state rates" shall mean charges for tuition and fees established by State Institutions for persons who are domiciled in South Carolina in accordance with this act; the words "out-of-state rates" shall mean charges for tuition and fees established by State Institutions for persons who are not domiciled in South Carolina in accordance with this act.
F. The words "independent person" shall mean a person in his majority, or an emancipated minor, whose predominant source of income is his own earnings or income from employment, investments, or payments from trusts, grants, scholarships, loans, or payments of alimony or separate maintenance made pursuant to court order.

G. The words "dependent" or "dependent person" shall mean one whose financial support is provided not through his own earnings or entitlements, but whose predominant source of income or support is payments from a parent, spouse, or guardian and who qualifies as a dependent on the federal tax return of the parent, spouse or guardian; provided, however, that the words "dependent" or "dependent person" shall not include a person who is the recipient of alimony or separate maintenance payments made pursuant to court order.

H. The word "minor" shall mean a person who has not attained the age of eighteen years; and the words "emancipated minor" shall mean a minor whose parents have entirely surrendered the right to the care, custody and earnings of such minor and are no longer under any legal obligation to support or maintain such minor.

I. The word "parent" shall mean a person's natural or adoptive father or mother; or if one parent has custody of the child, the parent having custody; or if there is a guardian or other legal custodian of such person, then such guardian or legal custodian; provided, however, that where circumstances indicate that such guardianship or custodianship was created primarily for the purpose of conferring South Carolina domicile for tuition and fee purposes on such child or dependent person, it shall not be given such effect.

J. The word "spouse" shall mean the husband or wife of a married person.

Tuition and Fees for Residents of State—Section 2. South Carolina domicile for tuition and fee purposes shall be established as follows in determinations of rates of tuition and fees to be paid by students entering or attending State Institutions:

A. Independent persons who reside in and have been domiciled in South Carolina for a period of no less than twelve months with an intention of making a permanent home therein, and their dependents, may be considered eligible for in-state rates.

B. Independent persons who reside in and have been domiciled in South Carolina for fewer than twelve months but who have full-time employment in the State, and their dependents, may be considered eligible for in-state rates for as long as such independent person is employed on a full-time basis in the State.

C. Where an independent person meeting the provisions of Section 2 B above, is living apart from his spouse, or where such person
and his spouse are separated or divorced, the spouse and dependents of such independent person shall have domiciliary status for tuition and fee purposes only under the following circumstances:

(1) if the spouse requesting domiciliary status for tuition and fee purposes remains domiciled in South Carolina although living apart or separate from his or her employed spouse;

(2) if the dependent requesting domiciliary status for tuition and fee purposes is under the legal custody or guardianship, as defined in Section 11 above, of an independent person who is domiciled in this State; or if such dependent is claimed as an income tax exemption by the parent not having legal custody but paying child-support, so long as either parent remains domiciled in South Carolina.

D. The residence and domicile of a dependent minor shall be presumed to be that of the parent of such dependent minor.

When Residency Changes—Section 3. When the domicile of a student or of the person upon whom a student is financially dependent changes after enrollment at a State Institution, tuition charges shall be adjusted as follows:

A. Except as provided in Section 2 B above, when domicile is taken in South Carolina, a student shall not become eligible for in-state rates until the beginning of the next academic session after expiration of twelve months from date of domicile in this State.

B. When South Carolina domicile is lost, eligibility for in-state rates shall end on the last day of the academic session in which the loss occurs, however, application of this subsection shall be at the discretion of the institution involved.

C. Notwithstanding the other provisions of this section, any dependent person who has been domiciled with his family in South Carolina for a period of not less than three years immediately prior to his enrollment may enroll in a state-supported institution of higher learning at the in-state rate and may continue to be enrolled at such rate even if the parent, spouse, or guardian upon whom he is dependent moves his domicile from this State.

Effect of Marriage—Section 4. Except as provided in Section 2 above, marriage shall affect determinations of domicile for tuition and fee purposes only insofar as it operates to evince an intention by the parties to make a permanent home in South Carolina.

Military Personnel and Their Dependents—Section 5. Notwithstanding other provisions of this act, during the period of their assignment to duty in South Carolina members of the armed services of the United States stationed in South Carolina and their dependents may be considered eligible for in-state rates. When such armed service personnel are ordered away from the State, their dependents may continue for an additional twelve months to have this eligibility
at the State Institutions where they are enrolled at the time such assignment ends. Such persons and their dependents may be considered eligible for in-state rates for a period of twelve months after their discharge from the armed services even though they were not enrolled at a State Institution at the time of their discharge, if they have evinced an intent to establish domicile in South Carolina and if they have resided in South Carolina for a period of at least twelve months immediately preceding their discharge.

Exceptions—Section 6. Full-time faculty and administrative employees of State Institutions, and the spouses and children of such persons, shall be excluded from the provisions of this Act.

Rates May Be Abated for Nonresidents on Scholarship—Section 7. Notwithstanding other provisions of this act, the governing boards listed in Section 1 A above, are authorized to adopt policies for the abatement of any part or all of the out-of-state rates for students who are recipients of scholarship aid.

Administration of Act—Duties of Students—Section 8. Each State Institution shall designate an official to administer the provisions of this act. Students making application to pay tuition and fees at in-state rates shall have the burden of proving to the satisfaction of the aforesaid officials of State Institutions that they have fulfilled the requirements of this act before they shall be permitted to pay tuition and fees at such rate.

Penalties for Willful Misrepresentations—Section 9. Where it appears to the satisfaction of officials charged with administration of these provisions that a person has gained domiciliary status improperly by making or presenting willful misrepresentations of fact, such persons shall be charged tuition and fees past due and unpaid at the out-of-state rate, plus interest at a rate of eight percent per annum, plus a penalty amounting to twenty-five percent of the out-of-state rate for one semester; and until these charges have been paid no such student shall be allowed to receive transcripts or graduate from any State Institution.

Regulations—Section 10.* The Commission on Higher Education may prescribe uniform regulations for application of the provisions of this act and may provide for annual review of such regulations.


Proof—Any student or prospective student in doubt concerning entitlement to payment of resident tuition and fees has the responsibility of securing a ruling by providing to the Dean of Admissions and Registration, on special forms provided for that purpose, all relevant information.

* Regulations may be obtained from the Office of Admissions and Registration.
STUDENT SERVICES

HOUSING

University residence halls will accommodate 5,354 students, two residents being assigned to a room. All residence halls are fully air-conditioned, and each bedroom is furnished in a manner that provides maximum comfort. The Clemson House which is located on the campus accommodates an additional 324 students.

Students who are assigned a room in University residence halls will be required to sign a residence hall contract relating to terms and conditions of occupancy for the full academic year. All students, regardless of whether they live in residence halls or off campus, must complete a locator card as part of the registration process and report all changes of address to the Student Locator Office.

Complete information to include application forms, description of residence halls and contract will be forwarded by the Housing Office to all new students who have been accepted for enrollment. Former students should write directly to the Housing Office for information concerning housing. A $75 advance payment must accompany the residence hall application. This amount is credited to the fall semester’s room rent and is refundable only under the conditions outlined in the contract.

MARRIED STUDENT HOUSING

Clemson provides comfortable and economical housing for its married students. There are two housing areas consisting of 100 East Campus apartments contained in 50 duplex buildings and 50 Littlejohn apartments in eleven buildings.

All married student housing units have two bedrooms, living room, kitchen, and bath. East Campus apartments are the newest and are equipped with range and refrigerator. In the Littlejohn Apartments, appliances must be furnished by the tenant.

Brochures describing married students’ housing may be obtained by writing to the Housing Office, Mell Hall, Clemson University, Clemson, South Carolina 29631.

STUDENT FOOD SERVICE

The University offers two economical board plans and also provides meals on a cash basis in two student dining halls with unlimited seconds on all items with the exception of some entre selections. The meal plans are as follows:

1. Five-Day Board Plan (15 meals), Monday through Friday—holidays excluded, $330 per semester.
2. Seven-Day Board Plan (21 meals), Monday through Sunday—holidays excluded, $385 per semester.
Both meal plans begin immediately after the student obtains a meal card at the beginning of a semester and end after the evening meal on the day of graduation. The meal card is personal and may not be loaned, transferred, or sold to another person.

Students who are entering the University for the first time from high school and who live in University residence halls (excluding the Clemson House) are required to subscribe to either the Five- or Seven-Day Plan for the full academic year (fall and spring semesters) or for the spring semester if students are entering in January. These students may not discontinue a meal plan as long as they remain enrolled during that academic year, except in the case of marriage or circumstances which are determined by the University to be beyond their control.

Upperclassmen and graduate students have the option at the time of their enrollment of selecting one of the two meal plans on a semester basis or paying cash for individual meals at the prevailing prices. Board plans for upperclassmen and graduate students are selected on a semester basis and may not be discontinued during the semester as long as the student remains enrolled, except in the case of marriage or circumstances which are determined by the University to be beyond their control.

All students may change from the Five- to the Seven-Day Board Plan at any time during the academic year by paying the added cost. Those desiring to change from the Seven- to the Five-Day Board Plan may do so only at the semester-payment period. Refunds, when authorized, will be made on a pro rata basis.

LAUNDRY AND DRY CLEANING

A plant with modern equipment is conveniently located on campus to service the laundry and dry-cleaning requirements of the student. Reasonable prices are charged for individual items on a cash-and-carry basis.

The University will not be liable for lost or damaged items unless reported within two days after the delivery date, and then for not more than the actual depreciated value of such articles as have been lost or damaged.

Coin-operated washing machines and dryers are available in the laundry building and several of the dormitories.

A student linen-rental service is also available. Information regarding this service will be forwarded to students who are accepted for enrollment in the University.

STUDENT HEALTH SERVICE

Student Health Service: Cost per Semester $55. Payment of the Student Health Service fee is required of all students living in University residence halls and all full-time students even though they do not reside in University housing.
The Student Health Service is housed in the Redfern Health Center and is complete with outpatient department and a 34-bed hospital. A full-time staff consists of four physicians, including the director, two psychiatrists as well as part-time psychologists, thirteen registered nurses, one registered X-ray technician, two registered laboratory technicians, a registered pharmacist, and one nurse practitioner. In addition, a sufficient number of nurses’ aides, secretarial workers, orderlies and maids for 24-hour-a-day operation are employed. The best of modern equipment is available for student use. Regular office hours are maintained, plus the services of the nursing staff for minor ailments after hours. One physician is on call at night for emergencies whenever the school is open. The Health Service is closed between semesters.

The Student Health Service at Clemson University has several important functions. All of these are aimed at keeping the student in good health so that he may effectively pursue his school work. There is, of course, the basic function of medical care for the ill and injured. This is a vital part of its work. In addition to this, the Student Health Service attempts to put strong emphasis on health rather than illness. This begins with the entrance medical form. In laying out this form an attempt is made to get information, examinations, and preventive medical procedures carried out to better equip the staff in protecting the student from illness and to serve as a guide for the care of preexisting medical problems.

As the student progresses through his academic experiences, other procedures may be required or highly recommended. These are primarily an effort to teach the individual self-responsibility for maintenance of his own health, protection of the health of those around him, and location of possible hidden diseases. The Health Service also has the position as the source of medical information as well as responsibility for indicated medical action: diagnostic, therapeutic, and preventive.

The medical fee paid by each student covers the services of the University physicians, the Health Service staff, and equipment for most illnesses and injuries occurring on or around the campus. This coverage is given under conditions similar to that of one’s own physician. The fee does not cover routine physical examinations for employment or transfer to another school, fees for outside physicians when called in for consultation, medical or surgical services performed away from the University, or for accidents occurring off the campus.

A complete pharmacy is maintained and dispenses medication to students as prescribed by the staff physicians.

Clemson University maintains a licensed emergency medical service which includes a modern modular ambulance and sufficient certified emergency medical technicians for 24-hour-a-day service.
All medical emergencies on campus will be handled by the unit. In addition, transportation for serious illnesses or emergencies requiring special care will be provided by the unit at no cost. The ambulance is not allowed to pick up off campus, except in disastrous situations. Elective off-campus medical requirements (transportation and consultation) will be the responsibility of the student.

**MEDICAL QUESTIONNAIRE**

Completion of a medical questionnaire is required of all new students entering Clemson University for the first time. This is to be completed by the student and mailed directly to Redfern Health Center, Clemson University, Clemson, South Carolina 29631. Some help may be needed from parents or family physician concerning necessary details about early childhood illnesses and immunizations. This questionnaire will be mailed to all accepted students in May.

It is highly recommended that students have a current tetanus toxoid series or booster within ten years and immunization against poliomyelitis, diptheria, measles, and mumps.

**ACCIDENT AND SICKNESS INSURANCE**

An accident and sickness insurance plan is available to all full- and part-time students and their dependents. Information concerning the insurance program is sent to students and parents with the fall semester prepayment material. Additional information may be obtained from the Office of Vice President for Student Affairs. This insurance is designed to cover major medical expenses not covered by the Health Service.

**GUIDANCE SERVICE**

Guidance has an important role at all levels of education and particularly so during times of transition and articulation. To assist students in this period of emotional and academic adjustment, an orientation and counseling program has been established.

At the beginning of his university career, each student is assigned to a faculty adviser selected from his academic college. The faculty advisers provide information on courses of study, approve class schedules, interpret academic regulations, make requests, and suggest adjustments in making satisfactory progress toward graduation.

The residence hall program is organized to cope with personal problems and questions regarding procedures and policies of college life. Residence hall counselors and supervisors are primarily concerned with maintaining an environment compatible to serious study and with the educational potential of group living.
COUNSELING SERVICES
The University Counseling Center has a basic goal of aiding students in their personal development and academic success. Professional counselors offer services to all students and their spouses on a free, voluntary, and confidential basis so that they may attain their own goals as well as to make more meaningful contributions as members of our society. Assistance is offered on a one-to-one basis with personal, social, academic, and vocational concerns. In addition, students may participate in small groups designed to help in various areas including study habits, personal growth, weight control, assertive training, stress management, and male-female relations. Testing is also available for helping students in vocational, personal, and social areas. Files and books on career information are available at the Counseling Center.

For students who are especially concerned about their choice of major, the Counseling Center has a computer terminal which is linked to the South Carolina Occupational Information System. Through this system the student can explore career choices in a logical and systematic way. The following information is available: descriptions of occupations, working conditions, employment outlook and sources for further information. The terminal also provides instant access to job openings in and near South Carolina.

CAREER SERVICES
Career planning and development opportunities are available to students who desire information and assistance concerning their involvement with the world of work. These services are provided by the Office of Cooperative Education and the Office of Placement, located on the eighth level of the Clemson University Union.

Cooperative Education Program The Cooperative Education Program is a planned program in which students at the University combine alternate periods of academic study and periods of related work with a participating business, industry, agency, or organization. The work periods normally take place during the sophomore and junior years (including summers), while the freshman and senior years are spent in full-time study.

Students qualify for participation in the Cooperative Education Program by satisfactory completion of thirty semester hours of academic work. Transfer students may qualify in one semester. Three, four, or five co-op work periods are projected and included in each student referral. Usually two students from the same academic area are paired to fill a full-time work position with a participating employer. A University registration fee of $15 is assessed cooperative education students for each work period, enabling them to maintain regular student status. While one student is at work, the other is
enrolled in classroom study at the University. All co-op student referrals are made by the Office of Cooperative Education to participating employers. Each cooperative education student who has fulfilled the academic requirements for graduation and has successfully completed a minimum of three work periods will be awarded a Cooperative Education certificate.

The Cooperative Education Program is offered to students enrolled in academic departments or programs in the Colleges of Agricultural Sciences, Architecture, Education, Engineering, Forest and Recreation Resources, Industrial Management and Textile Science, Liberal Arts, and Sciences.

Placement Service The University Placement Office provides assistance to students who seek permanent employment or summer work. The Office does not place candidates but assists them by providing counseling and seminars on career planning, job search, resume preparation, and interview techniques. Students are also encouraged to utilize the Placement Library consisting of reference books and literature provided by companies and agencies.

The Placement Office coordinates and plans campus interview visits with representatives from business, industry, and government agencies. These interviews are scheduled in the fall and spring semesters for qualified seniors or graduate students who are registered with the Placement Office.

Alumni seeking employment are encouraged to utilize the services of the Placement Office for counseling and guidance in their job search. They can be added to the mailing list and receive the Placement Bulletin which lists career opportunities and/or be referred to prospective employers.

UNDERGRADUATE FINANCIAL AID

The Office of Student Financial Aid, operating in conjunction with the University Scholarships and Awards Committee, is responsible for coordinating all types of financial assistance administered by the University. Currently available financial aids consist of scholarships, student loans, grants, and part-time employment. Sufficient aid is programmed to meet the requirements of all students meeting the criteria of financial need as determined by College Scholarship Service and academic ability/potential as evidenced by achievement at Clemson, or for entering students, high school records and College Entrance Examination Board Scholastic Aptitude Test scores.

Cutoff dates for Receipt of Applications are February 1 for Grants and Scholarships and June 1 for Loans.

A brochure describing financial aid programs and procedures for making application may be obtained by writing to the Office of Student Financial Aid, Clemson University, Clemson, South Carolina 29631.
EDUCATIONAL BENEFITS FOR VETERANS AND WAR ORPHANS

The Veterans Administration provides educational assistance for veterans and children of deceased or totally disabled veterans who meet requirements of applicable laws and regulations. Any veteran or child of a deceased or totally disabled veteran should communicate with the nearest Veterans Administration Office to determine whether or not he is entitled to any educational benefits.

THE J. E. SIRRINE TEXTILE FOUNDATION

Funds in this foundation were contributed by the members of the textile industry in South Carolina. Income from this fund is administered by the trustees of the J. E. Sirrine Textile Foundation. They have used the income to benefit teaching and research at Clemson University within the College of Industrial Management and Textile Science. Under the present system it is used to (1) supplement University travel funds for faculty members; (2) sponsor the college library; (3) provide supplement to the salaries for two major professors; (4) provide eight undergraduate scholarships and five graduate fellowships annually, one of which may be held by a faculty member; (5) sponsor annual seminars for South Carolina high school counselors; (6) support special research projects; (7) support economic education for public school teachers; and (8) sponsor the Clemson University Review of Industrial Management and Textile Science—a professional journal.

CLEMSON UNIVERSITY FOUNDATION

The Clemson University Foundation, comprised of twenty-one directors, is an incorporated tax-exempt foundation organized exclusively to help support the educational programs of Clemson University. Presently there are seven committees composed of alumni and nonalumni to procure contributions to advance the educational mission of Clemson University. The committees are as follows: Investment Committee, Alumni Liaison Committee, Deferred Gifts Committee, Business and Corporate Committee, Agriculture Committee, Committee on Foundations, and Forest and Recreation Resources Committee. As of December 1979, the total assets of the Clemson University Foundation, including permanent endowment, exceeded $5,000,000. Information concerning the operation of the Clemson University Foundation may be obtained by contacting the Office for Institutional Advancement.

HONORS AND AWARDS

The University offers a number of awards for outstanding achievement in specific fields and endeavors. Recipients are chosen by
selection committees and are announced at the annual Honors and Awards Day program or other appropriate ceremonies. Detailed information relating to such awards is available in the offices of the academic deans and department heads.

ALUMNI RELATIONS
The Office of Alumni Relations coordinates all functions and services of the Alumni Association. The director of alumni relations is secretary of the Clemson Alumni Association and the Clemson Foundation through election by the governing boards of these two organizations.

Accurate records of addresses and information concerning alumni are compiled by this office which also publishes a quarterly University magazine for distribution to the alumni and friends.

The purpose of the Alumni Association is to serve the University, its students, and its alumni. The Association holds its regular annual meeting at the University each June. Additional meetings are in January and at Homecoming in the fall. Active membership is made up of former Clemson students and parents of students who participate in the Clemson Alumni Loyalty Fund for the purpose of providing supplementary financial aid to the educational programs of the University.

RESERVE OFFICERS' TRAINING CORPS (ROTC)
The Departments of the Army and the Air Force both maintain ROTC units at Clemson University. The mission of the ROTC is to produce officers having leadership qualities and attributes essential to their progress and continued development as commissioned officers in either the Army or the Air Force of the United States. A four-year program, consisting of the basic course for freshmen and sophomores and the advanced course for juniors and seniors, is offered by both services.

Qualifications for basic ROTC enrollment are good moral character, physical qualification, and signing of an oath. Eligibility for Advanced ROTC is determined by a written Officer Qualification Test administered during the basic course.

Advanced course students receive $100 per month during each academic year. For the summer four-week field training course received by Air Force cadets and the six-week advanced camp received by Army cadets, pay is at the rate of one-half the base pay for a Second Lieutenant. A $25 refundable uniform deposit is required for basic students.

Basic course credit can be awarded students having one or more years of active military service or two or more years of Junior ROTC. These students should contact the Professor of Military Science
(PMS) or Aerospace Studies (PAS) concerning accreditation. A two-year program is also available for those students unable to take the basic course.

Scholarships are available to selected ROTC students who are strongly motivated toward a career in the military. Each scholarship pays for tuition, books, and laboratory expenses, in addition to $100 per month during the school year for the duration of the award.

For selected Air Force students in the advanced course, flight training at Government expense is available during the senior year.

Ample opportunity for graduate study exists in both services. Students who wish to pursue an advanced degree may, with the approval of their military department, be granted a temporary deferment to attend graduate school.

Officer Commissions Cadets who complete the advanced or Professional Officer Course are appointed Second Lieutenants in the U.S. Army or Air Force. As reserve officers they incur an obligation active duty as follows.

Army—Three years or six months active duty.

Air Force—Six years for pilots and five years for navigators after completion of flying training. Nonflying careers require four years.

SCHOLASTIC REGULATIONS

Proper discharge of all duties is required at Clemson University, and a student's first duty is his scholastic work. All students should be thoroughly acquainted with and cognizant of these basic requirements.

Credit System The semester hour is the basis of all credits. Generally, one recitation hour or three laboratory or shop hours a week for a semester constitute a semester hour. Thus, in ENGL 101, English Composition, 3(3,0), as you will find this subject listed in the Degrees and Curricula, the student takes three semester hours. When he completes this course satisfactorily, he is granted three semester credit hours on his record. The notation "3(3,0)" means that the course carries three credits, has three clock hours of theory or recitation per week, and no laboratory hours. CH 101, General Chemistry, 4(3,3), carries four semester hours, has three hours of theory, and a three-hour laboratory period.

Grades and Grade Reports The standing of a student in his work at the end of a semester is based upon daily classwork, tests or other work, and the final examinations. Faculty members may excuse from the final examinations all students having the grade of A on the work of the course prior to the final examination, but for all other students written examinations are required in all subjects at the end of each semester, except in certain laboratory or practical
courses in which final examinations are not deemed necessary by the department faculty.

Scholastic reports are mailed to students four times each year, including a preliminary statement of progress near the middle of each semester and a final report at the end of each semester.

**Grading System** The grading system is as follows:

A—*Excellent* Indicates that the student is doing work of a very high character. The highest grade given.

B—*Good* Indicates work that is definitely above average, though not of the highest quality.

C—*Fair* Indicates work of average or medium character.

D—*Pass* Indicates work below average and unsatisfactory. The lowest passing grade.

F—*Failed* Indicates that a student knows so little of the subject that it must be repeated in order that credit may be received.

I—*Incomplete* Indicates that a relatively small part of the semester's work remains undone. Grade I is not given a student who made a grade F on his daily work. Students are allowed thirty days after the beginning of the next semester in which the student is enrolled to remove the incomplete grades unless (1) an extension of time is approved by the instructor concerned, or (2) within one year of residence after receiving such a grade, a student repeats the conditional course satisfactorily at Clemson, in which case no credit hours taken shall be recorded for the grade of I. A student who elects to repeat an incomplete course is responsible for notifying the Office of Admissions and Registration of his election during the semester in which the course is taken. This election applies only to the first time that a course is repeated.

In order to make up incomplete work, the student should request the Office of Admissions and Registration to send a makeup card to the instructor concerned for reporting makeup grades.

W—*Withdraw* This grade indicates that the student withdrew from the course. No credit hours taken are recorded for the grade of W provided that the course is dropped prior to the last five weeks of classes in the semester. A student enrolled during any part of the last five weeks of classes shall have final grades recorded.

**Pass-Fail Option** Juniors or seniors enrolled in a four-year curriculum may take four courses (maximum of 15 credit hours), with not more than two courses in a given semester on a pass-fail basis. Transfer and five-year program students may take pass-fail courses on a pro rata basis.

Required courses or courses that are needed to fulfill departmental requirements may not be taken pass-fail.*

* Exception: RPA 206, 207, and 405 are offered on a Pass-Fail basis only.
Letter-graded courses which have been failed may not be repeated pass-fail.

Honors Program may exercise an option as to acceptance of pass-fail grading for Honors courses.

Registration in pass-fail courses will be handled in the same manner as for regular enrollment. Departmental approval must be obtained via approval form and returned to the Office of Admissions and Registration in accordance with the University Calendar for adding courses.

Instructors will submit letter grades to the Office of Admissions and Registration. These grades will then be converted as follows: A, B, C to P (pass); D, F to F (fail). Only P (minimum letter grade of C) or F will be shown on a student’s permanent record and will not affect the grade-point ratio.

If a student changes to a major which requires a previously passed course, and this course has been taken pass-fail, he may request either to take the course on a letter-graded basis, the P be changed to C, or substitution of another course.

In the event limited enrollment in a class is necessary, priority will be given as follows: majors, letter-graded students, pass-fail students, and auditors.

**Dropping Classwork** A subject dropped after the first four weeks of classwork and prior to the last five weeks is recorded as W—Withdrew.

**Removal of Failures** A student who has failed (made a grade F) in a subject cannot receive credit for that subject until it has been satisfactorily repeated hour for hour in class, except that in the case of correlated laboratory work, the number of hours to be taken shall be determined by the instructor. Where separate grades for class and laboratory work are given, that part of the subject shall be repeated in which the failure occurs.

**Rescheduling Courses Failed** A student who wishes to reschedule a course he has failed must do so within his next year of residence, or if the course is not offered during this year of residence, he must reschedule the course the first time it is offered thereafter during his attendance at Clemson.

**Rescheduling Courses Passed** A student may repeat a course he has passed with a grade lower than B provided he does so within three semesters of residence after the completion of his original enrollment in the course.

**Scheduling Remedial Mathematics** Any student who has passed a course in freshman mathematics is ineligible to enroll in Mathematical Sciences 100.
Advanced Placement and Credit by Examination  In addition to earning credit by the usual method involving classroom attendance, a student may receive credit toward his degree by completing a course successfully by examination only. Freshmen interested in exempting some of the elementary courses in this manner should participate in the College Board Advanced Placement Examination program and have the results of these tests sent to Clemson.

Certain departments will also grant credit for successful completion of College-Level-Examination Programs (CLEP) subject examinations which are administered by the College Board.

Credit may be earned by enrolled students by means of a special examination without the necessity of class attendance subject to the following requirements:

1. The applicant must present evidence which would indicate that he has received training or taken work which is approximately equivalent to that given in the course at Clemson for which an examination is requested and that an examination is warranted.

2. The applicant must not have previously failed or audited the course at Clemson.

3. The applicant must apply in writing for the examination and the request must be approved by the instructor, head of the department in which the course is taught, dean of the college in which the course is taught, and the Dean of Admissions and Registration. Application forms are available in the Office of Admissions and Registration.

4. Credit (CR) will be awarded for acceptable work in lieu of letter grades in recognition of college-level achievement as determined by College Board Advanced Placement Examinations, College-Level-Examination Program subject examinations, institutional special examinations, and similar instruments.

Work Taken at Another Institution  Clemson students may receive credit for work taken at another institution; however approval of the work should be obtained by the student prior to scheduling the work. Information and forms relative to this approval may be obtained in the Office of Admissions and Registration. By obtaining advance approval, the student is assured of receiving proper credit at Clemson provided he passes the work with a grade of C or higher.

Classification  All new students are classified as freshmen unless they have attended another college prior to entrance. Students who have completed college work elsewhere will be classified on the basis of semester hours accepted at Clemson rather than the amount of work presented. In order to be classified as a member of any class other than freshman, students must meet the credit-hour requirements indicated below:

Sophomore—30 credit hours
Junior—60 credit hours
Senior—95 credit hours
Credit Load  Except for an entering freshman who is restricted to the curriculum requirements of his major course, the credit load for an undergraduate must be approved by his class adviser. The class adviser will approve a credit load deemed in the best interest of the student based on such factors as course requirements, grade-point ratio, participation in other activities, and expected date of graduation.

Since grades are an important factor in determining credit loads, the student should be guided by the following table in presenting his schedule to his class adviser for approval:

<table>
<thead>
<tr>
<th>Grade-Point Ratio (Semester or Cumulative, Whichever Is Higher)</th>
<th>Recommended Maximum Number of Semester Hours to Be Scheduled</th>
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</thead>
<tbody>
<tr>
<td>0.00 to 0.99</td>
<td>15 to 16</td>
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<tr>
<td>1.00 to 1.99</td>
<td>16 to 18</td>
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<tr>
<td>2.00 to 2.99</td>
<td>18 to 20</td>
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<tr>
<td>3.00 to 4.00</td>
<td>20 to 22</td>
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ROTC Credit  Ten hours of aerospace studies or military science may be counted toward the baccalaureate degree in any curriculum.

Grade-Point Ratio  In calculating a student’s grade-point ratio, the total number of grade points accumulated by the student is divided by the total number of credit hours taken at Clemson during the semester, session, or other period for which the grade-point ratio is calculated. For each credit hour the student receives grade points as follows: A—4, B—3, C—2, D—1. No grade points are assigned for grades of F, I, or W.

Minimum Requirements for Continuing Enrollment  At the end of the academic year in May, all student records are inspected for quality. At that time in order to be able to continue enrollment after the following summer session, a student is required to achieve a cumulative average on the designated total hours attempted at Clemson as follows:

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<tr>
<th>Hours Attempted at Clemson</th>
<th>Required Minimum Cumulative Average</th>
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<tr>
<td>12–59</td>
<td>1.4</td>
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<tr>
<td>60–89</td>
<td>1.6</td>
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<tr>
<td>90 or more</td>
<td>1.8</td>
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</tbody>
</table>

A student completing a regular session has the privilege of continuing his enrollment through the immediately following summer session at Clemson in an effort to meet the above requirements.

A student who has taken fewer than 90 credit hours at Clemson and who fails to meet the required grade-point ratio, as indicated in the table above, may apply for readmission after a minimum of one semester has elapsed. A student who has taken 90-or-more credit
hours and fails to meet the required grade-point ratio is permanently ineligible for readmission. Any exceptions to these minimum requirements for continuing enrollment and readmission must be approved by the Committee on Admissions and Continuing Enrollment.

**Withdrawal from the University** A student may withdraw from the University any time before the last five weeks of classes in the semester without having grades recorded. A student enrolled during any part of the last five weeks of classes shall have final semester grades recorded.

After the first withdrawal from the University the student is eligible to continue his enrollment the following semester, provided he meets other applicable regulations. For each succeeding withdrawal, however, the student shall be ineligible to continue his enrollment the following semester unless there are extenuating circumstances approved by the Committee on Admissions and Continuing Enrollment. Ineligibility to continue the following semester also includes any intervening summer school.

A student who has been credited with 90-or-more credit hours of work taken at Clemson shall be permanently ineligible for readmission (regular or summer sessions), if at the time of withdrawal his cumulative grade-point ratio is below the requirement for continuing enrollment.

**Class Attendance** Regular and punctual attendance at all class and laboratory sessions is the responsibility of each student. College work proceeds at such a pace that regular attendance is necessary in order for each student to obtain maximum benefits from instruction. All absences are matters to be resolved between the instructor and the student. In the event that a student finds it necessary to be absent from a class, it is the student’s responsibility to make up resulting deficiencies.

In an early class the instructor shall inform the students of the attendance policy for that class. (Departments may establish uniform attendance policies for multiple section courses.) A student who incurs excessive absences may be dropped from a course by the instructor.

Students desiring to withdraw from a class must secure a drop card from the Registrar’s Office prior to terminating attendance. A student enrolled in the last five weeks of classes shall have final grades recorded.

**Course Prerequisites** Prerequisites for individual courses are enumerated under the course listings in the Description of Courses. In addition to these requirements, colleges and departments may also establish other standards as conditions for enrollment. In the College of Engineering a grade-point ratio of 1.8 or higher is required for registration in all engineering and engineering technology courses.
numbered 300 or higher. In the College of Nursing, a grade-point ratio of 2.0 or higher is required for registration in all nursing courses numbered 300 or higher. The College of Education requires a cumulative grade-point ratio of 1.6 or higher to enroll in 300-level courses and a cumulative grade-point ratio of 1.8 for 400-level education courses. Directed teaching and teaching methods courses require a minimum cumulative grade-point ratio of 2.0. Effective with the fall 1977-78 class of freshmen, students must have a cumulative grade-point ratio of 1.8 or higher to enroll in 300-level education courses and a cumulative grade-point ratio of 2.0 or higher for all 400-level education courses.

**Auditing Policies** Qualified students may audit courses upon the written approval of the professor, head of the department, and the dean of the college concerned, and must register with the Dean of Admissions and Registration. Auditors are under no obligation of regular attendance, preparation, recitation, or examination and receive no credit. Participation in classroom discussion and laboratory exercises by auditors is at the discretion of the instructor. A student who has previously audited a course is ineligible for credit by examination.

A full-time undergraduate student, with approval, may audit courses at no additional charge as long as the student’s credit load, including the course audited, is approved by his class adviser.

A graduate student regularly enrolled for a minimum of six semester hours may, with approval, audit one additional course without charge.

**ACADEMIC HONORS**

**Honor Graduates** To be graduated with honors a student must have a minimum cumulative grade-point ratio as follows: cum laude—3.4, magna cum laude—3.7, and summa cum laude—3.9.

**Dean’s List** At the end of the fall and spring semesters of each academic year, a Dean’s List shall be compiled of all undergraduate students who have achieved a grade-point ratio of 3.5 or higher on a minimum of twelve semester credit hours of courses taken during the preceding semester. Courses taken on a Pass-Fail basis are excluded from this minimum requirement.

**Honors Program** The Honors Program at Clemson University provides for the fuller development of our most able students. They meet with outstanding professors and explore the subject matter of
a course in greater depth than other students. To remain in the Honors Program a student must maintain a cumulative grade-point ratio of 3.0.

Admission to Honors work for incoming freshmen is by invitation. All other students are automatically eligible to take Honors classes if they have a grade-point ratio of 3.0 or better.

Planning and supervision of the Honors Program is done by an Honors Council composed of faculty members from each college. The Honors Program Student Handbook is available in the Honors Program Office, 416 Strode Tower, or from the Dean of Undergraduate Studies.

Students who graduate in the Honors Program will have this fact indicated on their diplomas.

Honors and Awards Day Each spring an Honors and Awards Day is held for students who qualify for special awards.

GRADUATION REQUIREMENTS
A candidate for an undergraduate degree is a student who has turned in a completed diploma application by the deadline prescribed in the University Calendar for a particular graduation date.

Residence Requirement In order to qualify for an undergraduate degree, a student must spend at least the last year of residence at Clemson and complete at Clemson a minimum of 30 of the last 36 credits presented for the degree.

Examination on F Received in Last Semester A candidate for a degree who, in the semester immediately prior to graduation, fails to graduate because of an F on one course taken in that semester may stand a special examination on the course provided:

1. That the candidate can furnish evidence of having done satisfactory study for the examination.
2. That the examination is not given until after the regular degree date.
3. That the candidate has fulfilled, prior to the due date for candidates' grades, all other requirements for his degree except those which can be fulfilled by passing the examination.
4. That the candidate by removing the F by examination will finish all requirements for his degree which will be awarded on the next regular date for award of degrees.

The privileges of this provision will be extended to the candidate who meets the stated requirements above, but fails to graduate because of an F on one course taken the last time the course was offered, and for which no acceptable substitute has been offered since the course was failed as attested to by the candidate's major department head and the head of the department in which the failed
course was offered. In no way will this exception be interpreted to permit more than one special reexamination on an F.

**Make-up of I's Received in Last Semester**  A candidate for a degree who in the semester immediately prior to graduation receives one or more grades of I shall have an opportunity of removing the unsatisfactory grades provided the final grades are received in the Office of Admissions and Registration by the time grades for candidates for graduation are due.

A candidate who qualifies for graduation under this regulation will be awarded his degree on the regular date for the award of degrees.

**Special Requirements**  A cumulative grade-point ratio of 2.0 is required for graduation. Candidates for degrees are required to apply for their diplomas within three weeks following the opening of the final semester or the opening of the summer session prior to the date the degrees are to be awarded. These applications should be filled out in the Office of Admissions and Registration on the regular blanks provided.

All work for a degree must be completed, all financial settlements made, and all government property and library books returned by 5 p.m. on the Tuesday preceding graduation.

A student in line for graduation at the end of this semester who fails to graduate because of an F on one course taken this semester may stand a special examination under certain conditions on the course after the regular degree date. A senior who qualifies for graduation under this provision will be awarded his degree on the next regular date for the award of degrees. For further information see paragraph Examination on F Received in Last Semester.

A student in line for graduation at the end of a semester or summer term who meets all requirements for graduation except for a deficiency in his grade-point ratio resulting from a deficiency of not more than six grade points shall have the privilege of making up his deficiency by standing special reexaminations under certain conditions.

The examinations shall be taken after the regular degree date and in courses totaling not more than six semester credit hours which were passed during the last year of residence, and only one such examination may be taken on an individual course. When such examinations are taken under the above provision, the credit hours of the course or courses will not be counted as additional credit hours taken. Only the grade points over and above the grade points previously earned in the course may count toward raising the grade-point ratio.

A student who qualifies for graduation under this provision will be awarded his degree on the next regular date for the award of degrees.

If all work toward a degree is not completed within five years after entrance, the student may be required to take additional courses.
HISTORY

It was the fall of the year and likely one of those blustery days as the horse drawn carriage slowly rolled to a stop on a Pendleton road in 1886.

The driver, a tall, distinguished-looking man in his late 70's peered from the carriage as if looking for someone he knew. Soon, another aged man approached the carriage, exchanged greetings with the first, and the two men—Thomas Green Clemson and Senator Benjamin Ryan Tillman—drove away together toward historic Fort Hill, a plantation some four miles away and the former homestead of John C. Calhoun, Clemson's late father-in-law.

Mr. Clemson had invited Senator Tillman to his home to discuss their mutual conviction that South Carolina needed a separate college devoted to industrial and scientific education. At Fort Hill, they met with Colonels D. K. Norris and R. W. Simpson. There the four "spent nearly the whole day in talking over the new project which Mr. Clemson had in mind and which he unfolded to us," Tillman later wrote.

Perhaps the most significant result of this conference was Mr. Clemson's decision to change a will he had made three years earlier and to execute a new will so as to serve better the great purpose which he had had in mind for many years.

Although his will of 1883 sought to provide for establishment of a scientific institution upon the Fort Hill place, Mr. Clemson later decided that his intention and purpose as stated in that will might be misunderstood.

In his new will, executed November 6, 1886, Mr. Clemson wrote that he desired to make his purpose plain and to make some other changes in the disposition of his property. He clearly explained the nature and purpose of his proposed institution, the establishment of which "is now the one great desire of my life."

"It should afford thorough instruction in agriculture and the natural sciences connected therewith; it should combine, if practicable, physical and intellectual education, and should be a high seminary of learning in which the graduate of the common schools can commence, pursue and finish the course of studies terminating in thorough, theoretic and practical instruction . . ."

The first item of the new will concerned disposition of the 814 acres of the Fort Hill place and was largely taken from the 1883 will.

The will gave to the State all that part of the Fort Hill Estate inherited by Mrs. Clemson (the former Anna Maria Calhoun who died in 1875, thirteen years before her husband) from her mother and the bulk of Mr. Clemson's other real and personal property. The latter amounted to a sum which, considering the purchasing power at the time, probably has been only a few times exceeded in a public benefaction in South Carolina.
Mr. Clemson's will also provided for a seven-member Board of Trustees that would govern and manage the new institution. Named were Colonels Simpson and Norris, M. L. Donaldson, R. E. Bowen, B. R. Tillman, J. E. Wannamaker, and J. E. Bradley who with those chosen by the General Assembly would constitute a governing board if the State accepted the bequest; but, who, in the event the State declined the bequest, would alone constitute a governing board for a private institution.

These seven trustees, along with other friends of the movement and the agricultural groups in the State, developed and organized a public opinion favorable to the plan.

In November 1889, the South Carolina General Assembly accepted the terms of Mr. Clemson's will and following the decision of the U.S. Supreme Court to uphold the will, the State of South Carolina and the full Board of Trustees proceeded to convert the dream of Thomas G. Clemson into the reality of Clemson College.

The institution formally opened in July 1893, with an enrollment of 446 students. The first graduating exercises were held in December 1896, with a graduating class of 37—15 in the agricultural courses and 22 in engineering courses.

The college was also established under the Morrill Land-Grant Act passed by the National Congress in 1862. Clemson University, therefore, is a member of the national system of Land-Grant Colleges and Universities.

In 1964, in recognition of expanded offerings of the institution not only in the areas of agricultural and mechanical arts but also in the sciences and arts, the name of the institution was changed to Clemson University. This change by the legislature, effective July 1, 1964, followed a recommendation to that body by the Board of Trustees.

LOCATION

The University is located on the Fort Hill homestead of John C. Calhoun, in the foothills of the Blue Ridge Mountains. It has an elevation of 800 feet above sea level and commands an excellent view of the mountains to the north and west, some of which attain an altitude of over 5000 feet.

The University is located at Clemson, South Carolina, on the main line of the Southern Railway. U.S. Highways numbers 76 and 123 pass through Clemson, and daily bus service at regular intervals is available.

BUILDINGS AND GROUNDS

Campus architecture is a pleasing blend of the old and new complemented by a beautiful landscape of abundant trees, grassy expanses, and flowering plants and shrubs.
The campus proper consists of 600 acres. The academic buildings, student housing, service facilities and equipment are valued at $168 million. Basically the campus is the site of Thomas Green Clemson’s plantation, willed to South Carolina in 1888 for the establishment of the University. Fort Hill, former home of both Mr. Clemson and his father-in-law, John C. Calhoun, has been preserved at the center of the campus as a national shrine.

Challenges of the present—developing alternate energy sources and better conservation technology, improving agricultural production along with technology transfer, and improved health-care delivery—are symbolized by such buildings as the new multipurpose center for the College of Nursing. Clemson’s long, rich tradition of education, scientific research, and public service is brought to mind by historic structures like Tillman Hall and its clock tower, focal point of the campus, whose cornerstone was laid in 1891.

Beyond the main campus, stretching into Oconee, Pickens, and Anderson counties are another 24,000 acres of farm and agricultural and forestry research lands. Throughout the State are 8,300 more acres devoted to Agricultural Experiment Station research and 4-H Club activities.

One of the central features of campus development is the Robert Muldrow Cooper Library with its large reflection pool. This beautiful structure houses some 762,408 volumes, 31,504 microcards, 18,005 reels of microfilm, and 343,746 units of microfiche. It is the permanent home of papers and souvenirs of State Senator Edgar A. Brown, as well as valuable collections of papers and letters of John C. Calhoun, James F. Byrnes, and other famous South Carolina statesmen.

Facilities completed during the latter 1960’s and early seventies include three high-rise residence halls which house 1,296 students, a low-rise dormitory, a 34-bed hospital and outpatient clinic, an East Campus cafeteria, an arts and sciences classroom building and 10-story faculty office tower, and the multipurpose J. C. Littlejohn Coliseum which seats 11,000 people for basketball games and 12,000 for speaking engagements, concerts and other functions.

Teaching and laboratory facilities of the College of Agricultural Sciences are housed in the R. F. Poole Agricultural Center complex. Another grouping serves the College of Engineering, including Olin Hall for ceramic engineering and Earle Hall for chemical engineering. These two buildings and their excellent equipment represent gifts from the Olin Foundation totaling nearly $2 million.

The first phase of a major renovation of Sirrine Hall, home of the College of Industrial Management and Textile Science, was completed in the fall of 1978. A second phase of construction is currently under way.

The College of Architecture is located in the modern, well-equipped Lee Hall. Other groupings of classrooms and laboratories serve the
College of Education, College of Liberal Arts, and College of Sciences.

Recent major additions to the campus include Jordan Hall for biological sciences and a multipurpose center for the College of Nursing. Complete renovation and expansion of McAdams Hall agricultural engineering building was completed in 1976.

A complex for the College of Forest and Recreation Resources and College of Agricultural Sciences administration was completed in 1975.

Other facilities include Jervey Athletic Center, and expansion of Lee Hall which houses the College of Architecture, Clemson University Union and related facilities, and additions and renovations at Fike Recreation Center, including a natatorium with a standard Amateur Athletic Union size swimming pool with tartan deck and a diving tank.

The University's 17 residence halls for men and women accommodate 5,354 students. An additional 320 coeds are housed at the Clemson House, a multipurpose facility. Living accommodations for married students are provided in 250 individual units and apartments. A new housing complex consisting of two-story, apartment-type units will accommodate 500 students, and will be ready for occupancy in the fall of 1980.
Undergraduate curricula are offered under the colleges of Agricultural Sciences, Architecture, Education, Engineering, Forest and Recreation Resources, Industrial Management and Textile Science, Liberal Arts, Nursing, and Sciences.

The University grants the following degrees upon satisfactory completion of the requirements prescribed by the colleges listed.

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<thead>
<tr>
<th>College of Agricultural Sciences</th>
<th>Science Teaching</th>
<th>BS</th>
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<tr>
<td>Agricultural Economics and</td>
<td>Biological Sciences</td>
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<td>Rural Sociology</td>
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<td>Agricultural Business</td>
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<td>Community and Rural Development</td>
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<tr>
<td>Agricultural Education†</td>
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<td>Agricultural Mechanization and</td>
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<td>Agronomy—Crops and Soils</td>
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<td>Horticulture—Fruit and Vegetable,</td>
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<td>Ornamental, and Turfgrass</td>
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<td>Design</td>
<td>Chemical Engineering</td>
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<td>Engineering Technology</td>
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<td>Mechanical Engineering</td>
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<td>Elementary Education</td>
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</table>

* Jointly administered by the College of Agricultural Sciences and the College of Engineering.
† Jointly administered by the College of Agricultural Sciences and the College of Education.
### College of Industrial Management and Textile Science
- Accounting: BS
- Administrative Management: BS
- Economics: BA, BS
- Financial Management: BS
- Industrial Management: BS
- Textile Chemistry: BS
- Textile Science: BS
- Textile Technology: BTT

### College of Liberal Arts
- English: BA
- History: BA
- Modern Languages: BA
- Political Science: BA
- Psychology: BA
- Sociology: BA

### College of Nursing
- Nursing: AA, BS

### College of Sciences
- Biochemistry: BS
- Botany: BS
- Chemistry: BA, BS
- Geology: BA, BS
- Mathematical Sciences: BA, BS
- Medical Technology: BS
- Microbiology: BS
- Physics: BA, BS
- Prepharmacy: Nondegree
- Prephysical Therapy: Nondegree
- Zoology: BS

### BACHELOR OF ARTS AND BACHELOR OF SCIENCE IN PREPROFESSIONAL STUDIES

Clemson University will award the degree of Bachelor of Arts or Bachelor of Science in Preprofessional Studies to a student who has satisfactorily completed three years of undergraduate work in an appropriate curriculum and the first year of work in an accredited medical, dental, veterinary, law, or other accredited, professional, postgraduate school provided the student fulfills the requirements for the three-year program as follows and the other specified conditions are met.

1. At least two of the three years of preprofessional work, including the third year, must be taken in residence at this University.
2. A minimum of three years of undergraduate work (i.e., preprofessional school credit) must be presented.
3. Normal progress must have been made toward fulfilling the degree requirements of the curriculum in which the student is enrolled at Clemson.
4. The student applying for the Bachelor of Arts or Bachelor of Science in Preprofessional Studies must be recommended by the college at Clemson in which the curriculum that he is majoring as a Clemson student is located or by the college in which three years of normal progress toward a degree can be identified.
5. If the combination of preprofessional work taken and the work in the first year of professional school is equivalent to that which is required in some other bachelor's degree program at Clemson, the college concerned may recommend the other bachelor's degree.

The above requirements and conditions became effective July 1, 1974, and will apply to all students who satisfy these requirements and conditions after that date.
A Clemson student having left the University before receiving the bachelor's degree (prior to July 1, 1974), and having enrolled immediately in an accredited, professional, postgraduate school may apply for a bachelor's degree from Clemson and have his application considered on an individual basis. The college or colleges at Clemson considering his application are authorized to examine the student's entire record in both preprofessional and professional studies and exercise their own judgment concerning the three-year requirement for preprofessional studies.

GRADUATE DEGREES
The degrees of Doctor of Philosophy, Education Specialist, Master of Arts, Master of Science, Master of Agricultural Education, Master of Agriculture, Master of Architecture, Master of City and Regional Planning, Master of Education, Master of Engineering, Master of Fine Arts, Master of Forestry, Master of Industrial Education, Master of Nutritional Sciences, and Master of Recreation and Park Administration are awarded to those students who satisfactorily complete prescribed graduate programs. The Master of Business Administration degree is available through a joint program with Furman University.

For further information concerning advanced degrees see The Graduate School Announcements, which may be obtained from the Office of the Dean of Graduate Studies and University Research.

COURSE NUMBERS
In the curricula which follow are given the official titles and number of the courses, the descriptive titles, the number of semester hours credit, and in parentheses, the number of hours per week in class and laboratory, respectively.
COLLEGE OF AGRICULTURAL SCIENCES

Modern agriculture involves the science, business, and art of producing, processing, and distributing plant and animal products and includes economics and human relations associated with these activities. Agriculture is a unique educational area because of the economic and human welfare implications in the application of the basic sciences to biological problems and materials.

Thousands of agricultural graduates are needed annually to serve this basic industry. Our land-grant colleges and universities are graduating less than the number demanded to fill careers with a future, with a challenge, and careers that indeed serve humankind.

Today's agriculture includes much more than farm production. Agriculture is a complex profession. About 6 million people provide supplies and services for farmers, and 10 million process and distribute farm products. These two segments, together with farm production which employs 5 million workers, provide careers somewhere in agriculture for 21 million Americans—approximately one-third of all jobs.

The College of Agricultural Sciences offers eight Bachelor of Science majors, two of which are jointly administered with other colleges: Agricultural Education with the College of Education and Agricultural Engineering with the College of Engineering. Within these eight degree majors, a student may select one of 16 curricula as follows: Agricultural Economics and Rural Sociology with curricula in Agricultural Business and Community and Rural Development; Agricultural Education; Agricultural Engineering; Agricultural Mechanization and Business; Animal Industries with curricula in Animal Science, Dairy Science, and Poultry Science; Economic Biology with curricula in Economic Zoology (emphasis on wildlife biology), Entomology, and Plant Pathology; Food Science; and Plant Sciences with a curriculum in Agronomy and three curricula in Horticulture: Fruit and Vegetable, Ornamental, and Turfgrass.

MINOR CONCENTRATIONS

The curricula in agriculture are designed to provide a solid foundation of principles on which to solve problems and to do this in a practical setting of real-world situations. A minor is required in all curricula except Agricultural Engineering, Agricultural Mechanization and Business, and all curricula in the Economic Biology major. Six formal minors have been established as follows:

Business This minor emphasizes principles and practices of business management as applied to businesses and industries associated with agriculture. It is designed for students who plan to work with one of the many businesses and industries that provide supplies and services for the farmer and process and distribute farm products.
Environmental Science  This minor emphasizes an understanding of the environment, including cause-and-effect relationships. It is designed for students who wish to supplement their undergraduate majors with knowledge and skills uniquely applicable to the environment in relation to agriculture.

International Agriculture  This minor emphasizes the international aspects of agriculture and applies basic scientific principles and agricultural practices to worldwide agriculture. It is designed for students who contemplate work in international agricultural positions either in the United States or abroad.

Production  This minor emphasizes the application of scientific principles to agricultural production. It is designed for students whose anticipated work requires broad general training in scientific and practical agriculture.

Science  This minor emphasizes the basic sciences that prepare students to contribute to the advancement of knowledge in their respective fields. It is designed for students whose anticipated work requires considerable scientific training, usually including graduate studies.

Second Department  This minor emphasizes special training in an area of study other than the major. A Second Department minor may be selected either within or outside of the College of Agricultural Sciences. It is designed for students who wish additional specialized training outside their major area of study.

GRADUATE STUDY
The College of Agricultural Sciences also offers programs leading to the Master of Agriculture, Master of Agricultural Education, Master of Nutritional Sciences, Master of Science, and Doctor of Philosophy degrees.

AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY
The Agricultural Economics and Rural Sociology curriculum includes majors in Agricultural Business and Community and Rural Development.

AGRICULTURAL BUSINESS
The major in Agricultural Business places emphasis on a strong background in economics with applications to agricultural and agriculturally-related businesses. Also included are courses in basic agricultural and biological sciences, liberal arts, and business. Students also have sixteen hours of free electives that may be used for further specialization or to broaden the educational experience.

Employment opportunities open to graduates with an Agricultural Business major are many. These include sales and promotional work
for a variety of businesses, management positions in the farm-loan departments of private banks or with cooperative farm credit agencies, public relations activities for various firms, market managers and directors, county agents, representatives of government agencies serving agriculture, and operators of numerous enterprises.

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGRIC 103 Intro. to Animal Ind.</td>
<td>AGRIC 104 Intro. to Plant Sci.</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>Physical Biological Science Requirement</td>
<td>Physical Biological Science Requirement</td>
</tr>
<tr>
<td>ACCT 201 Principles of Acct</td>
<td>ACCT 202 Principles of Acct</td>
</tr>
<tr>
<td>ECON 211 Principles of Econ</td>
<td>ECON 212 Agricultural Econ</td>
</tr>
<tr>
<td>Literature Requirement</td>
<td>English Requirement</td>
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<tr>
<td>Mathematical Sciences Option</td>
<td>Mathematical Sciences Option</td>
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<tr>
<td>Physical Biological Science Requirement</td>
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<tr>
<td>Social Science Elective</td>
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**SOPHOMORE YEAR**

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<tbody>
<tr>
<td>AGRIC 103 Intro. to Animal Ind.</td>
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**JUNIOR YEAR**

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<tr>
<td>AGRIC 103 Intro. to Animal Ind.</td>
<td>AGRIC 104 Intro. to Plant Sci.</td>
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<tr>
<td>ENGL 101 English Composition</td>
<td>ENGL 102 English Composition</td>
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<tr>
<td>Physical Biological Science Requirement</td>
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<td>ACCT 201 Principles of Acct</td>
<td>ACCT 202 Principles of Acct</td>
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<tr>
<td>ECON 211 Principles of Econ</td>
<td>ECON 212 Agricultural Econ</td>
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**SENIOR YEAR**

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<thead>
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<th>First Semester</th>
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<tbody>
<tr>
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134 Total Semester Hours

1To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2Mathematical Sciences options
   Option A: CPSC 110, 120, MTHSC 101, 102, EXST 301 or MTHSC 203 (12 credit hours).
   Option B: CPSC 110, MTHSC 106, 210, 301 (13 credit hours).
3Seventeen hours of physical and biological sciences are required with at least 6 hours to be chosen from physical sciences and at least 6 hours to be chosen from biological sciences. Physical sciences are defined as astronomy, chemistry, geology, and physics. Biological sciences are defined as biochemistry, biology, botany, genetics, microbiology, zoology.
4To be selected from the following: ENGL 231, 301, 304.
5To be selected from the following: GEOG 301, HIST 101, 102, 306, 308, POSC 101, 302, PSYCH 201, SOC 201, 204.
6Twelve hours to be selected from the following: AGRIC 301, 302, 303, 401, 402, 403, 404, 405, 406, 407, 412.
7To be selected from the following: ECON 302, 407, 412.
8Twelve hours to be selected from the following: AGRIC 302, 403 or 413, 409, 452, 456.
9To be selected from the following: RS 359, 401, 471.
10Courses in the College of Agricultural Sciences outside of the Department of Agricultural Economics and Rural Sociology.
COMMUNITY AND RURAL DEVELOPMENT

The purpose of a major in Community and Rural Development is to provide functional academic training for students interested in community and rural development programs. The major provides an interdisciplinary education with emphasis on working with people and business and governmental groups. Employment opportunities in community and rural development are evidenced by new educational programs in cooperative extension services, expansion of credit for development by private and public-service programs of government agencies, and professional needs in multicounty councils of government. These and other activities have resulted in a strong demand for graduates trained in the basic concepts, principles, and practice of community and rural development. The Community and Rural Development major also provides an excellent background for graduate study in several disciplines.

FRESHMAN YEAR

First Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AGRIC 103 Intro. to Animal Ind.</td>
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<tr>
<td>ENGL 101 English Composition</td>
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<tr>
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<td>Physical Biological Science Requirement①</td>
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<tr>
<td>AGRIC 103 Intro. to Animal Ind.</td>
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<tr>
<td>ENGL 102 English Composition</td>
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<td>Mathematical Sciences Option①</td>
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<td>Physical Biological Science Requirement①</td>
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<tr>
<td><strong>Total</strong></td>
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SOPHOMORE YEAR

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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>ACCT 200 Basic Accounting</td>
<td>3 (3.0)</td>
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<tr>
<td>ECON 211 Principles of Econ</td>
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<td>HIST 102 History of the U. S</td>
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<td>Literature Requirement②</td>
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<td>AGEC 202 Agriculture Economics</td>
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<tr>
<td>Earth Science Requirement②</td>
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<td>English Requirement②</td>
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<td><strong>Total</strong></td>
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JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course Code</th>
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<tr>
<td>AGEC 352 Public Finance</td>
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<tr>
<td>CRD 357 Natural Res. Econ.</td>
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<td>ECON 314 Inter. Econ. Theory</td>
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<tr>
<td>RS 301 Rural Sociology</td>
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<td>Elective</td>
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<tr>
<td>RS 359 The Community</td>
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<tr>
<td>Advanced Economics Elective④</td>
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<tr>
<td>Planning Elective④</td>
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<td>Minor③</td>
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<td><strong>Total</strong></td>
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SENIOR YEAR

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CRD 411 Reg. Impact Analysis to Econ.</td>
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<tr>
<td>EXST 462 Statistics Applied to Econ.</td>
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<td>Adv. Rural Sociology Elective④</td>
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<td>Adv. Social Science Elective④</td>
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<td>Planning Elective④</td>
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<td>CRD 412 Reg. Econ. Dev. Pol.</td>
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<td><strong>Total</strong></td>
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16 Total Semester Hours

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2 Sixteen hours of physical and biological sciences are required with at least six hours to be chosen from physical sciences and at least six hours from biological sciences. Physical sciences are defined as astronomy.
chemistry, geology, and physics. Biological sciences are defined as biochemistry, biology, botany, genetics, microbiology, and zoology.

3 Mathematical Sciences Options

Option A: CPSC 110, 120, MTHSC 101, 102, and 203 or EXST 301.

Option B: CPSC 110, MTHSC 106, 210, 301.

4 To be selected from: GEOG 301, HIST 306, 308, POSC 101, 302, PSYCH, 201, SOC 204.

5 To be selected from AGM 301, AGRON 202, 404, GEOG 101, GEOL 400.

6 To be selected from ENGL 231, 301, 304.

7 To be selected from: ECON 302, 407, 420, 421, 422, IM 406.

8 To be selected from: CAPL 411, 472, 473.

9 To be selected from: RS 401, 471.

10 To be selected from: GEOG 302, POSC 321, 423, 425, 427, SOC 206, 208, 324, 421, 431, 441.

11 See adviser for available minors and course requirements.

**AGRICULTURAL EDUCATION**

The Agricultural Education major is designed for students who wish to prepare for positions in vocational agriculture, agricultural occupations, and other teaching positions in the secondary schools; engage in other forms of educational work such as agricultural missionary, public relations, and agricultural extension; farming, soil conservation, and other governmental work; business and industry.

The curriculum provides for a broad education in general and professional education including student teaching. In addition to required courses giving a thorough background in the agricultural and biological sciences, a student may minor in *Business, International Agriculture, or a Second Department.* Students in other departments in the College of Agricultural Sciences may minor in Agricultural Education and be certified to teach if they meet all requirements.

### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>AGRIC 104 Intro. to Plant Sci.</td>
<td>3 (2,3)</td>
</tr>
<tr>
<td>BIOL 105 General Biology I</td>
<td>3 (3,0)</td>
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<tr>
<td>CH 101 General Chemistry</td>
<td>1 (0,3)</td>
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<tr>
<td>ENGL 101 English Composition</td>
<td>3 (3,0)</td>
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<tr>
<td>MTHSC 102 Intro. to Math. Anal.</td>
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<tr>
<td>AGED 100 Orient. and Field Exp.</td>
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<tr>
<td>AGRIC 103 Intro. to Animal Ind.</td>
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<tr>
<td>BIOL 104 General Biology II</td>
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<tr>
<td>BIOL 106 General Biology Lab. II</td>
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### SOPHOMORE YEAR

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<tr>
<td>AGEC 202 Agric. Economics</td>
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<td>AGED 201 Intro. to Agric. Ed.</td>
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<td>AGM 205 Principles of Farm Shop</td>
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<td>PHYS 207 General Physics I</td>
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<td>AGRON 202 Soils</td>
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<td>ENGL 231 Intro. to Journalism</td>
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<td>or ENGL 301 Pub. Speaking</td>
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<td>or ENGL 304 Adv. Comp.</td>
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<tr>
<td>FOR 305 Elements of Forestry</td>
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<td>FOR 307 Elem. of Forestry Lab</td>
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<th>First Semester</th>
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<tbody>
<tr>
<td>AGM 301 Soil and Water Conserv</td>
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<td>or AGEC 402 Prod. Econ.</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>AGRON 452 Soil Fert. and Mgt.</td>
<td>2 (2,0)</td>
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<tr>
<td>AGRON 453 Soil Fert. Lab.</td>
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<td>ANSC 301 Feeds and Feeding</td>
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<tr>
<td><strong>Total:</strong></td>
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</tbody>
</table>
SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours (SA)</th>
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<tbody>
<tr>
<td>HORT 407 Landscape Design</td>
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<tr>
<td>PLPA 401 Plant Pathology</td>
<td>3 (2,2)</td>
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<tr>
<td>Elective</td>
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<tr>
<td>AGED 300 Supv. Field Exp. II</td>
<td>1 (0,3)</td>
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<tr>
<td>AGED 401 Meth. in Agric. Ed.</td>
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</tr>
<tr>
<td>AGED 406 Directed Teaching</td>
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<tr>
<td>AGED 423 Curriculum</td>
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<tr>
<td>AGED 425 Teach. Agric. Mech.</td>
<td>2 (1,3)</td>
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<tr>
<td>ED 302 Educational Psychology</td>
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</table>

134 Total Semester Hours

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2 Students who make a satisfactory score on the Mathematics Test. Level II (Standard) may schedule other mathematics courses or electives in lieu of MTHSC 102. Students ineligible for MTHSC 102 will take MTHSC 105.
3 To be selected from the following: HIST 101, 102, 172, 173, PHIL 201, 325, POSC 101, PSYCH 201, RS 301, 401, SOC 201.
4 See adviser for available minors and course requirements.

AGRICULTURAL ENGINEERING

The graduate in agricultural engineering, with broad training in mathematics, physics, chemistry, and the biological sciences as well as comprehensive coverage of the engineering sciences, is well equipped to apply engineering to many functions affecting the well-being of mankind. The agricultural engineer is sought by industry and public service organizations primarily for his ability to apply engineering know-how to agricultural production and processing and to the management of land and water resources. Specific areas of interest include power and machinery, soil and water resources engineering, electric power and processing, structures and environment, and food engineering.

The curriculum includes such engineering sciences as mechanics, fluids, thermodynamics, electrical theory, computing devices and systems analyses. The basic agricultural sciences of soils, plants, and animals are included to provide a foundation for agricultural engineering analysis and design. Also included are the important facets of energy conversion, engineering properties of biological materials, research methods, and use of economy and integrity in design.

Graduate programs lead to the Master of Science, Master of Engineering, and the Doctor of Philosophy degrees.

Opportunities for employment of agricultural engineering graduates include design engineers, research engineers, production engineers, or as sales engineers with industry; as teachers, research, extension, or field engineers with state and federal agencies; engineers in the private sector; and others.

FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH 101 General Chemistry</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>MTHSC 108 Cal. of One Var. II</td>
</tr>
<tr>
<td>ENGR 180 Engineering Concepts</td>
<td>PHYS 122 Phys. with Cal. I</td>
</tr>
<tr>
<td>or Humanistic-Social Elective</td>
<td>Basic Science2</td>
</tr>
<tr>
<td>MTHSC 106 Cal. of One Var. I</td>
<td>Humanistic-Social Elective2</td>
</tr>
<tr>
<td>or ENGR 180 Engr. Concepts</td>
<td>or Elective</td>
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<tr>
<td>Elective</td>
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FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>CH 101 General Chemistry</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>MTHSC 108 Cal. of One Var. II</td>
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<tr>
<td>ENGR 180 Engineering Concepts</td>
<td>PHYS 122 Phys. with Cal. I</td>
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<tr>
<td>or Humanistic-Social Elective</td>
<td>Basic Science2</td>
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<tr>
<td>MTHSC 106 Cal. of One Var. I</td>
<td>Humanistic-Social Elective2</td>
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<tr>
<td>or ENGR 180 Engr. Concepts</td>
<td>or Elective</td>
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### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>AGE 221 Soil and Water</td>
<td>3 (2,3)</td>
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<tr>
<td>Resources Engineering I</td>
<td>2 (2,3)</td>
</tr>
<tr>
<td>EG 109 Engr. Graphics</td>
<td>3 (2,3)</td>
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<tr>
<td>EM 201 Engr. Mech. (Statics)</td>
<td>4 (2,3)</td>
</tr>
<tr>
<td>MTHSC 206 Calculus of Sev. Var.</td>
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<tr>
<td>PHYS 221 Phys. with Cal. II</td>
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<tr>
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### JUNIOR YEAR

<table>
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<tbody>
<tr>
<td>AGE 353 Computational Systems</td>
<td>2 (1,3)</td>
</tr>
<tr>
<td>AGE 355 Engr. Anal. and Creat.</td>
<td>2 (1,3)</td>
</tr>
<tr>
<td>E&amp;CE 307 Basic Elec. Engr.</td>
<td>3 (2,3)</td>
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<tr>
<td>E&amp;CE 309 Elec. Engr. Lab. I</td>
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<tr>
<td>EM 304 Mechanics of Materials</td>
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<td>ME 311 Engineering Thermo. I</td>
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<tr>
<td>Animal Science Elective^2</td>
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### SENIOR YEAR

<table>
<thead>
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<tr>
<td>AGE 431 Agric. Structures Design</td>
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<tr>
<td>AGE 471 Research I</td>
<td>1 (2,3)</td>
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<tr>
<td>ECON 200 Economic Concepts</td>
<td>3 (2,3)</td>
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<tr>
<td>ECON 211 Prin. of Economics</td>
<td>3 (2,3)</td>
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<tr>
<td>Engineering Science Elective^1</td>
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<tr>
<td>Mathematical Sciences Elective^2</td>
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</table>

### Total Semester Hours

138

^1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

^2 Electives to be selected in consultation with adviser.

Note: Agricultural Engineering curriculum is jointly administered by the College of Agricultural Sciences and the College of Engineering.

### AGRICULTURAL MECHANIZATION AND BUSINESS

The major in Agricultural Mechanization and Business is designed to provide an educational program for undergraduate students who desire training in areas which are relevant to a dynamic agricultural enterprise. It is organized with strength both in the business management area and in nonengineering type support of technical agriculture and agribusiness concepts. In order to produce an individual who is well rounded and capable of communicating, the curriculum includes courses in the humanities, social sciences, English composition, and public speaking.

The graduate in agriculture with a major in Agricultural Mechanization and Business should be able to find meaningful and remunerative employment in a variety of situations directly and indirectly related to agricultural production, processing, marketing, and the many services connected therewith.
<table>
<thead>
<tr>
<th>FRESHMAN YEAR</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td><strong>Second Semester</strong></td>
<td></td>
</tr>
<tr>
<td>BIOL 103 General Biology I</td>
<td>AGRIC 103 Intro. to Animal Ind.</td>
<td></td>
</tr>
<tr>
<td>BIOL 105 General Biology Lab. I</td>
<td>AGRIC 104 Intro. to Plant Sci.</td>
<td></td>
</tr>
<tr>
<td>CH 101 General Chemistry</td>
<td>BIOL 104 General Biology II</td>
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<tr>
<td>ENGL 101 English Composition</td>
<td>BIOL 106 General Biology Lab. II</td>
<td></td>
</tr>
<tr>
<td>MTHSC 105 Algebra and</td>
<td>CH 102 or 112 General Chemistry</td>
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<tr>
<td>Trigonometry</td>
<td>ENGL 102 English Composition</td>
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<tbody>
<tr>
<td>AGEC 202 Agricultural Economics</td>
<td>ACCT 201 Principles of Accounting</td>
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<td>AGM 205 Principles of Farm Shop</td>
<td>AGM 206 Agricultural Mechanization</td>
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<tr>
<td>ECON 109 Engineering Graphics</td>
<td>AGM 300 General Agriculture</td>
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</tr>
<tr>
<td>PHYS 207 General Physics I</td>
<td>AGM 303 General Agric. Mkt.</td>
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<tr>
<td>Literature Requirement</td>
<td>ENGL 301 English Composition</td>
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<tr>
<td>Social Science Elective</td>
<td>Economics Elective</td>
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<table>
<thead>
<tr>
<th>JUNIOR YEAR</th>
<th></th>
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<tbody>
<tr>
<td>AGEC 351 Adver. and Merchandising</td>
<td>AGEC 302 Econ. of Farm Mgmt</td>
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<tr>
<td>or AGEC 352 Public Finance</td>
<td>AGEC 309 Econ. of Agric. Mkt.</td>
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<tr>
<td>AGM 302 Rainfall, Runoff, and Erosion Control</td>
<td>ENGL 301 English Composition</td>
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<tr>
<td>AGM 406 Mech. and Hydr. Systems</td>
<td>Agriculture Elective</td>
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<tr>
<td>AGRON 202 Soils</td>
<td>Economics Elective</td>
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<tr>
<td>Social Science Elective</td>
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<td>Elective</td>
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<td>18</td>
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</table>

<table>
<thead>
<tr>
<th>SENIOR YEAR</th>
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</thead>
<tbody>
<tr>
<td>AGEC 319 Agribusiness Mgt</td>
<td>AGM 404 Farm Structures</td>
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<tr>
<td>or AGEC 409 Agribusiness Org</td>
<td>AGM 409 Equip. Sales and Service</td>
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<tr>
<td>AGM 402 Drainage, Irrigation, and Waste Management</td>
<td>AGM 472 Seminar</td>
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<td>AGM 452 Farm Power</td>
<td>Agriculture Elective</td>
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<tr>
<td>AGM 460 Farm and Home Utilities</td>
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<td></td>
<td>134 Total Semester Hours</td>
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</table>

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2 To be selected from the following: ENGL 231 or 304.
3 Eligible students may enroll in MTHSC 106 in lieu of 105.
4 To be selected from the following: ED 302, GEOG 101, 301, 302, HIST 101, 102, 172, 173, PHIL 201, 325, POSC 101, PSYCH 201, RS 301, 401, SOC 201.
5 See class adviser.

**ANIMAL INDUSTRIES**


**ANIMAL SCIENCE MAJOR**

The Animal Science Department emphasizes subject matter dealing with the application of scientific principles to livestock production and processing.

Students will minor in Business, Environmental Science, International Agriculture, Production, Science, or a Second Department.
Occupations for Animal Science graduates include livestock farming; cattle, swine and sheep breeding; extension livestock specialists; feed specialists; county agents; teaching and research in animal industry; positions with meat packing companies; feed dealers; freezer locker operators; livestock dealers; and livestock commission brokers.

<table>
<thead>
<tr>
<th>FRESHMAN YEAR</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td><strong>Second Semester</strong></td>
</tr>
<tr>
<td>BIOL 103 General Biology I</td>
<td>AGRIC 103 Intro. to Ani. Ind.</td>
</tr>
<tr>
<td>BIOL 105 General Biology Lab. I</td>
<td>AGRIC 104 Intro. to Plant Science</td>
</tr>
<tr>
<td>CH 101 General Chemistry</td>
<td>BIOL 104 General Biology II</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>BIOL 105 General Biology Lab. II</td>
</tr>
<tr>
<td>MTHSC 105 Algebra and Trigonometry</td>
<td>CH 102 or 112 General Chemistry</td>
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<td></td>
<td>ENGL 102 English Composition</td>
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</tr>
<tr>
<td><strong>Sophomore Year</strong></td>
<td><strong>Junior Year</strong></td>
</tr>
<tr>
<td>ANSC 202 Intro to Animal Sci</td>
<td>ANPH 301 Physiology and Anatomy of Domestic Animals</td>
</tr>
<tr>
<td>CH 223 Organic Chemistry</td>
<td>or ZOOL 301 Comp. Vert. Anat.</td>
</tr>
<tr>
<td>and CH 227 Org. Chem. Lab</td>
<td>ENGL 231 Intro. to Journalism</td>
</tr>
<tr>
<td>or BIOCH 210 Elem. Biochem</td>
<td>or ENGL 301 Pub. Speaking</td>
</tr>
<tr>
<td>or CH 201 General Chemistry</td>
<td>or ENGL 304 Adv. Comp.</td>
</tr>
<tr>
<td>Literature Requirement</td>
<td>PHYS 122 Phys. with Cal. I</td>
</tr>
<tr>
<td>Minor</td>
<td>or PHYS 207 Gen. Phys. I</td>
</tr>
<tr>
<td>Social Science Elective</td>
<td>Minor</td>
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<tr>
<td>Elective</td>
<td>Elective</td>
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<tr>
<td></td>
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<tr>
<td></td>
<td><strong>Senior Year</strong></td>
</tr>
<tr>
<td>ANSC 301 Feeds and Feeding</td>
<td>ANSC 306 Livestock Selection and Judging</td>
</tr>
<tr>
<td>ANSC 303 Livestock Evaluation</td>
<td>MICRO 305 General Microbiology</td>
</tr>
<tr>
<td>ANSC 351 Meat Ident. and Util</td>
<td>Minor</td>
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<tr>
<td>or ANSC 355 Meats Lab</td>
<td>Elective</td>
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<td>ANSC 353 Meats</td>
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<td>GEN 302 Genetics</td>
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</table>

1To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

2Students who make a satisfactory score on the Mathematics Test, Level II (Standard) may schedule other mathematics courses or electives in lieu of MTHSC 105. MTHSC 102 or 106 can substitute for MTHSC 105.

3See adviser for available minors and course requirements.

4To be selected from the following: ED 302, HIST 101, 102, 172, 173, PHIL 201, 325, POSC 101, PSYCH 201, RS 301, 401, SOC 201.
DAIRY SCIENCE MAJOR

The curriculum in Dairy Science is designed to provide the student with an understanding of scientific principles and the application of these principles in the scientific, technical, and business phases of the dairy industry. Completion of required studies in the sciences and humanities and selected courses by the student in areas of personal interest prepares the graduate for a successful chosen profession. A career in the dairy industry is a rewarding one, not only monetarily, but in rendering a service in providing a wholesome, nutritious food for mankind.

Opportunities for dairy science graduates are many. They include the management of production and processing facilities, quality control work for processing units and production organizations, industrial promotion and public relations work in both production and processing fields, dairy and food products engineering, special services, public health service, teaching and research. Special service opportunities are available in state and national breed association work, breeding organizations, industrial supplies, production and processing equipment and supplies. Opportunities in educational activities include positions with industrial associations, state and federal services and federal programs with foreign assignments.

Students majoring in Dairy Science may choose a minor in Business, Environmental Science, International Agriculture, Production, Science or a Second Department.

**FRESHMAN YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 103 General Biology I ..........</td>
<td>AGRIC 103 Intro. to Animal Ind. ......</td>
</tr>
<tr>
<td>BIOL 105 General Biology Lab. I .....</td>
<td>AGRIC 104 Intro. to Plant Science ....</td>
</tr>
<tr>
<td>CH 101 General Chemistry ...........</td>
<td>BIOL 104 General Biology II ..........</td>
</tr>
<tr>
<td>ENGL 101 English Composition ......</td>
<td>BIOL 106 General Biology Lab. II .....</td>
</tr>
<tr>
<td>MTHSC 105 Algebra and Trigonometry^2</td>
<td>CH 102 or 112 General Chemistry ......</td>
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<td>ENGL 102 English Composition .......</td>
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**SOPHOMORE YEAR**

| AGEC 202 Agric. Economics ..........| ENGL 231 Intro. to Journalism ......|
| AGRON 202 Soils ...................| or ENGL 301 Publ. Speaking ....... |
| or ACCT 201 Prin. of Acct. .......| or ENGL 304 Adv. Comp. ..........  |
| CH 223 Organic Chemistry ..........| PHYS 122 Phys. with Cal. I ....... |
| or BIOCH 210 Elem. Bioch. .........| Minor^4 ................................|
| or CH 201 General Chemistry ......| Social Science Elective^3 .........|
| DYSC 101 Dairy Foods .............| Elective ............................|
| or DYSC 102 Mam. Repro. ..........| 1-2 ......                         |
| Literature Requirement^1 ..........| 17  ................................ |
| Social Science Elective^3 ..........|                                      |
|                                    | 17  ................................ |

---

^1 Literature Requirement: 3 (3.0)
^2 Trigonometry: 5 (5.0)
^3 Elective: 3 (3.0)
^4 Minor: 6 (3.0)
^5 Social Science Elective: 3 (3.0)
### JUNIOR YEAR

<table>
<thead>
<tr>
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<th>Course Title</th>
<th>Credits</th>
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<tbody>
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<td>DYSC 310</td>
<td>Dairy Cattle Sel.</td>
<td>1 (0.3)</td>
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<tr>
<td>or FDSC 424</td>
<td>Qual. Assur. and Sens. Eval. Lab.</td>
<td>1 (0.3)</td>
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<tr>
<td>FDSC 305</td>
<td>Dairy and Food Engr.</td>
<td>3 (2.3)</td>
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<tr>
<td>MICRO 305</td>
<td>General Microbiology</td>
<td>4 (3.3)</td>
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<tr>
<td>Minor^2</td>
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<td><strong>Total</strong></td>
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<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>ANSC 301</td>
<td>Feeds and Feeding</td>
<td>3 (3.0)</td>
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<tr>
<td>or MICRO</td>
<td>407 Food and Dairy</td>
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<td>DYSC 306</td>
<td>Dairy Technology</td>
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<td>GEN 302</td>
<td>Genetics</td>
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<td>Minor^3</td>
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<tr>
<td></td>
<td><strong>Total</strong></td>
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134 Total Semester Hours

---

1^To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209

2^Students who make a satisfactory score on the Mathematics Test, Level II (Standard) may schedule other mathematics courses or electives in lieu of MTHSC 105.

3^To be selected from the following: ED 302, HIST 101, 102, 172, 173, PHIL 201, POSC 101, PSYCH 201, RS 301, 401, SOC 201.

4^See adviser for available minors and course requirements.

### POULTRY SCIENCE MAJOR

This curriculum provides the student with a broad education in science and the humanities and specialized knowledge of the biology of the avian species and of the poultry industry. Avian science courses emphasize the nutrition, physiology, genetics, and pathology of domesticated and semidomesticated birds. The environmental requirements for propagating the various species and for handling eggs and meat are covered.

Minors in Business, Environmental Science, International Agriculture, Production, Science or a Second Department provide for the specialized interests of the student.

Job opportunities include supervisory positions with producers of eggs, broilers, turkeys, or game birds; technical representatives for feed manufacturers, vitamin and mineral suppliers, pharmaceutical and biological houses; extension specialists; teachers or researchers with a college, in government or industry; salesmen or marketing specialists; quality control and poultry products technologists; government graders, inspectors or sanitarians.

### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGRIC 103</td>
<td>Intro. to Animal Ind.</td>
<td>3 (2.3)</td>
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<tr>
<td>and AGRIC 104</td>
<td>Intro. to Plant Scie.</td>
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<tr>
<td>Plant Sci.</td>
<td></td>
<td></td>
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<tr>
<td>or MTHSC 105</td>
<td>Alg. and Trig.^2</td>
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<tr>
<td>BIOL 103</td>
<td>General Biology I</td>
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<tr>
<td>BIOL 105</td>
<td>General Biology Lab. I</td>
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<td>CH 101</td>
<td>General Chemistry</td>
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<td>English Composition</td>
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<tr>
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<td>and AGRIC 103</td>
<td>Intro. to Animal Ind.</td>
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<tr>
<td>or MTHSC 105</td>
<td>Alg. and Trig.^2</td>
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<td>BIOL 104</td>
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<td>BIOL 106</td>
<td>General Biology Lab. II</td>
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### SOPHOMORE YEAR

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<thead>
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<th>Course</th>
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<tbody>
<tr>
<td>AGEC 202 Agric. Economics</td>
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<td>GEN 302 Genetics</td>
<td>4 (3.3)</td>
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<tr>
<td>PHYS 207 General Physics I</td>
<td>4 (3.2)</td>
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<tr>
<td>PS 202 Avian Science</td>
<td>3 (2.3)</td>
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<tr>
<td>CH 223 Organic Chemistry²</td>
<td>3 (3.0)</td>
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<tr>
<td>and CH 227 Org. Chem. Lab</td>
<td>1 (0.3)</td>
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<tr>
<td>or BIOCH 210 Elem. Bioch.</td>
<td>4 (3.3)</td>
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<tr>
<td>or CH 201 General Chemistry</td>
<td>4 (3.3)</td>
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<td>ENGL 231 Intro. to Journalism</td>
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<tr>
<td>or ENGL 304 Adv. Comp.</td>
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<td>MICRO 305 Gen. Microbiology</td>
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<tr>
<td>PS 322 Poultry Breeding and Gen.</td>
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### JUNIOR YEAR

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<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>ANSC 301 Feeds and Feeding</td>
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<tr>
<td>ENGL 301 Public Speaking</td>
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<tr>
<td>PS 321 Incubation and Hatchery Management</td>
<td>2 (1.3)</td>
</tr>
<tr>
<td>PS 355 Poultry Products Grading and Technology</td>
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<tr>
<td>PS 451 Poultry Nutrition</td>
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<tr>
<td>ANPH 301 Physiology and Anatomy of Domestic Animals</td>
<td>3 (2.3)</td>
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<tr>
<td>PS 359 Management of Egg, Broiler and Turkey Enterprises</td>
<td>3 (2.3)</td>
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### SENIOR YEAR

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<tr>
<td>PS 401 Animal Environ. Tech.</td>
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<td>PS 403 Animal Environ. Tech. Lab</td>
<td>1 (0.3)</td>
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<td>PS 458 Avian Micro. and Parasit.</td>
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<tr>
<td>Social Science Elective⁴</td>
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<tr>
<td>Elective</td>
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<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>PS 454 Least Cost Feed Form</td>
<td>2 (1.2)</td>
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<tr>
<td>PS 460 Seminar</td>
<td>1 (1.0)</td>
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<td>Elective</td>
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</table>

### Total Semester Hours

134

¹To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
²Students who make a satisfactory score on the Mathematics Test, Level II (Standard) may schedule other mathematics courses or electives in lieu of MTHSC 105.
³Science minors should schedule CH 223, 227; Business minors may substitute ACCT 201.
⁴To be selected from the following: ED 302, GEOG 101, 301, 302, HIST 101, 102, 172, 173, PHIL 201, 325, POSC 101, PSYCH 201, RS 301, 401, SOC 201.
⁵See adviser for available minors and course requirements.

### ECONOMIC BIOLOGY

The Economic Biology major includes areas of concentration in Economic Zoology, Entomology, and Plant Pathology.

### FRESHMAN YEAR

**First Semester**

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>BIOL 110 Prin. of Biology I</td>
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<tr>
<td>CH 101 General Chemistry</td>
<td>4 (3.3)</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>3 (3.0)</td>
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<tr>
<td>MTHSC 105 Algebra and Trigonometry²</td>
<td>5 (5.0)</td>
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**Second Semester**

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>BIOL 111 Prin. of Biology II</td>
<td>5 (4.3)</td>
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<tr>
<td>CH 112 General Chemistry</td>
<td>4 (3.3)</td>
</tr>
<tr>
<td>ENGL 102 English Composition</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 106 Cal. of One Var. I</td>
<td>4 (4.0)</td>
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<tr>
<td>or MTHSC 102 Intro. to Math. Anal.</td>
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### SOPHOMORE YEAR

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<th>Course</th>
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<tbody>
<tr>
<td>AGRON 202 Soils</td>
<td>3 (2.2)</td>
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<tr>
<td>CH 223 Organic Chemistry</td>
<td>3 (3.0)</td>
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<tr>
<td>CH 227 Organic Chemistry Lab.</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>ENT 301 General Entomology</td>
<td>3 (2.3)</td>
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<tr>
<td>English Requirement¹</td>
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<td>Elective</td>
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</table>

¹To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209. Zoology and Entomology majors are required to take ENGL 304 during the second semester.

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AGEC 202 Agric. Economics</td>
<td>3 (3.0)</td>
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<tr>
<td>CH 224 Organic Chemistry³</td>
<td>3 (3.0)</td>
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<tr>
<td>GEN 302 Genetics</td>
<td>4 (3.3)</td>
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<td>PHYS 122 Phys. with Cal. I</td>
<td>3 (2.2)</td>
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<tr>
<td>or PHYS 207 Gen. Phys. I</td>
<td>4 (3.2)</td>
</tr>
<tr>
<td>English Requirement²</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>16-17</td>
</tr>
</tbody>
</table>

### ECONOMIC ZOOLOGY CONCENTRATION

This curriculum is designed for the student interested in careers in applied animal biology. With increased interest and concern for conservation of natural resources and the environment, this area is becoming increasingly technical and will require large numbers of highly trained animal biologists. It is possible for the student in this concentration to elect courses to fit specific needs or interests.

Greatest demands for graduates are in the following areas: research, survey and regulatory positions with state and federal environmental protection, fish, wildlife, and public health agencies; in public relations and sales positions with commercial companies; industrial research and quality control laboratories; conservational, recreational and other public service agencies: and private enterprises.

See page 61 and above for Freshman and Sophomore years.

### JUNIOR YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 301 Public Speaking</td>
<td>BIOCH 301 Molecular Biology</td>
</tr>
<tr>
<td>EXST 301 Intro. Statistics</td>
<td>MICRO 305 General Microbiology</td>
</tr>
<tr>
<td>PHYS 208 General Physics I</td>
<td>ZOOL 202 Vertebrate Zoology</td>
</tr>
<tr>
<td>or PHYS 221 Phys. with Cal. I</td>
<td>or ZOOL 201 Invert. Zoology</td>
</tr>
<tr>
<td>and PHYS 223 Physics Lab. I</td>
<td>Wildlife Biology Elective³</td>
</tr>
<tr>
<td>ZOOL 201 Invertebrate Zoology</td>
<td>Elective¹</td>
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<tr>
<td>or ZOOL 202 Vertebrate Zoology</td>
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<td>Elective¹</td>
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| Total | 17 |

### SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>ENT 468 Intro. to Research</td>
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<tr>
<td>ZOOL 340 Cell Biology</td>
<td>4 (3.3)</td>
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<tr>
<td>ZOOL 456 Parasitology</td>
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<tr>
<td>Social Science Elective³</td>
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<tr>
<td>Elective¹</td>
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| ZOOL 411 Animal Ecology         | 4 (3.3) |
| Social Science Elective³        | 3       |
| Wildlife Biology Elective²      | 7       |
| Elective¹                       | 17      |

134 Total Semester Hours

¹Elective shall be determined by each individual student in consultation with his adviser to complement and reinforce the student's planned area of study.

²To be selected from any wildlife biology courses except WB 306.

³To be selected from the following: ED 302, HIST 101, 102, 172, 173, PHIL 201, POSC 101, PSYCH 201, RS 301, 401, SOC 201.
ENTOMOLOGY CONCENTRATION

Entomology is a unique scientific discipline which has its basic roots in biology. It is the study of insects, their biology and control. Insects form the largest and most widely distributed class of animals in the world. They affect the lives of everyone and are man's greatest competitors. However, not everything about insects is bad. Some, such as bees, are essential for pollination while others serve as parasites and predators in natural control of pest species.

There are exciting opportunities for professional entomologists in basic and applied areas of work such as (1) development of new and more selective methods of insect control involving both chemical and biological agents; (2) pest management practice and consulting; (3) perform services as quarantine and regulatory officials; (4) carry information to the public as extension entomologists; (5) apply knowledge in teaching programs; (6) insect control in the pest control industry; and (7) entomologists in the armed forces.

See pages 61-62 for Freshman and Sophomore years.

<table>
<thead>
<tr>
<th>JUNIOR YEAR</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>ENGL 301 Public Speaking .......... 3 (3.0)</td>
<td>ACCT 201 Principles of Accounting ...... 3 (3.0)</td>
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<tr>
<td>ENT 405 Insect Morphology .......... 4 (3.3)</td>
<td>or EXST 301 Intro. Statistics .......... 3 (2.2)</td>
</tr>
<tr>
<td>ENT 468 Intro. to Research ........ 2 (1.3)</td>
<td>ENT 410 Insect Taxonomy ............. 3 (1.6)</td>
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<tr>
<td>PHYS 208 General Physics II ....... 4 (3.2)</td>
<td>MICRO 305 General Microbiology ...... 4 (3.3)</td>
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<tr>
<td>or PHYS 221 Phys. with Cal. II ..... 3 (2.2)</td>
<td>Entomology Elective¹ ..................... 3</td>
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<tr>
<td>and PHYS 223 Physics Lab. I ...... 1 (0.3)</td>
<td>Elective ................................ 4</td>
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<tr>
<td>ZOOL 201 Invertebrate Zoology ...... 4 (3.3)</td>
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<tr>
<td>ENT 461 Special Problems in Entomology and Econ. Zool. ...... 1 (1.0)</td>
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<tr>
<td>PLPA 401 Plant Pathology .......... 3 (2.2)</td>
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<tr>
<td>ZOOL 411 Animal Ecology .......... 4 (3.3)</td>
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<tr>
<td>Entomology Elective¹ ............. 3</td>
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<tr>
<td>Social Science Elective² .......... 3</td>
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<td>Elective ................................ 3</td>
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<td>134 Total Semester Hours</td>
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¹At least 6 credits must be selected from the following: ENT 401, 402, 403, 404, 455.
²To be selected from the following: ED 302, HIST 101, 102, 172, 173, PHIL 201, POSC 101, PSYCH 201, RS 301, 401, SOC 201.

PLANT PATHOLOGY CONCENTRATION

Plant pathology is that branch of science that deals with the nature and control of the diseases of plants. Since man began to cultivate plants for food and fiber production, plant diseases have been a constant threat to the health and productivity of these plants. They have caused severe famines and mass migrations of people from one area to another since the dawn of recorded history. The current annual economic loss to plants from diseases in the United States
has been estimated to be in excess of three billion dollars. In 1970 one disease alone on corn caused a loss of approximately one billion dollars in the eastern half of the United States.

Opportunities for graduates in Plant Pathology are dependent upon the level of training, experience, and interest of the graduate. These job opportunities include research with federal, state, industrial, or private agencies; inspection, quarantine and other regulatory work with federal and state agencies; sales and technical service work with industry, especially those industries involved with agricultural pesticides; agricultural extension work, both in the United States and in foreign countries; and teaching at the college or university level.

See pages 61-62 for Freshman and Sophomore years.

<table>
<thead>
<tr>
<th>First Semester</th>
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<tbody>
<tr>
<td>MICRO 305 General Microbiology</td>
<td>BOT 331 Intro. Plant Taxonomy</td>
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<tr>
<td>PHYS 208 General Physics II</td>
<td>BOT 421 Plant Physiology</td>
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<td>or PHYS 221 Phys. with Cal. II</td>
<td>ENGL 301 Public Speaking</td>
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<td>and PHYS 223 Physics Lab. I</td>
<td>Plant Pathology Elective</td>
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<td>PLPA 401 Plant Pathology</td>
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<td>or FOR 407 Forest Pathology</td>
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<th>JUNIOR YEAR</th>
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<tbody>
<tr>
<td>134 Total Semester Hours</td>
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</table>


2 To be selected from the following: ED 302, HIST 101, 102, 172, 173, PHIL 201, 325, POSC 101, PSYCH 201, RS 301, 401, SOC 201.

3 At least 9 credits must be selected from BOT 411, MICRO 416, PLPA 451, 456, 458.

4 Electives shall be determined by each individual student in consultation with his adviser to complement and reinforce the student’s planned area of study.

**FOOD SCIENCE**

The Food Science major is designed to prepare students for the many career opportunities in technical and management areas of the food industry. The food industry, being the nation’s largest industry, is becoming increasingly technical and requires large numbers of professional food scientists. World food supplies, particularly those rich in protein, are becoming increasingly critical in many parts of the globe. This situation is expected to accelerate the demand for food scientists.

Opportunities for graduates in Food Science include research positions in government organizations and state experiment stations;
supervisory, administrative, research and quality control positions in food processing industries; inspection and grading work with state and federal agencies; consulting, teaching and extension activities with universities and colleges. Students graduating in Food Science are well prepared to pursue postgraduate training in areas such as microbiology, biochemistry, and nutrition, as well as in food science.

The student majoring in Food Science will select a minor in Business, Environmental Science, International Agriculture, Science, or a Second Department which will emphasize training in an area other than food science and which is designed to supplement the major course of study.

**FRESHMAN YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>BIOL 103 General Biology I</td>
<td>BIOL 104 General Biology I</td>
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<td>BIOL 105 General Biology Lab. I</td>
<td>BIOL 106 General Biology Lab. II</td>
</tr>
<tr>
<td>CH 101 General Chemistry</td>
<td>CH 102 or 112 General Chemistry</td>
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<tr>
<td>ENGL 101 English Composition</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>FDSC 101 Man's Struggle for Food</td>
<td>MTHSC 106 Cal. of One Var. I</td>
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<tr>
<td>MTHSC 105 Algebra and Trig.</td>
<td>Elective</td>
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**SOPHOMORE YEAR**

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<tbody>
<tr>
<td>AGEC 202 Agric. Economics</td>
<td>BIOCH 210 Elem. Biochemistry</td>
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<tr>
<td>CH 223 Organic Chemistry</td>
<td>ENGL 231 Intro. to Journalism</td>
</tr>
<tr>
<td>and CH 227 Organic Chem. Lab.</td>
<td>or ENGL 304 Adv. Comp.</td>
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<tr>
<td>or CH 201 General Chemistry</td>
<td>FDSC 212 Man's Food Resources</td>
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<td>PHYS 122 Phys. with Cal. I</td>
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<td>or PHYS 207 Gen. Phys. I</td>
<td>or PHYS 221 Phys. with Cal. II</td>
</tr>
<tr>
<td>Literature Requirement¹</td>
<td>and PHYS 223 Physics Lab. I</td>
</tr>
<tr>
<td>Social Science Elective²</td>
<td>Elective</td>
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**JUNIOR YEAR**

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>EXST 301 Introductory Statistics</td>
<td>ENGL 301 Public Speaking</td>
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<tr>
<td>FDSC 305 Dairy and Food Engr.</td>
<td>FDSC 422 Quality Assurance and</td>
</tr>
<tr>
<td>MICRO 305 General Microbiology</td>
<td>Sensory Evaluation</td>
</tr>
<tr>
<td>NUTR 451 Human Nutrition</td>
<td>FDSC 424 Quality Assurance and</td>
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<tr>
<td>Minor¹</td>
<td>Sensory Evaluation Lab.</td>
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**SENIOR YEAR**

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>FDSC 401 Food Chemistry I</td>
<td>FDSC 402 Food Chemistry II</td>
</tr>
<tr>
<td>FDSC 403 Food Preservation and Processing I</td>
<td>FDSC 404 Food Preservation and Processing II</td>
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<tr>
<td>FDSC 405 Food Preservation and Processing Lab. I</td>
<td>FDSC 406 Food Preservation and Processing Lab. II</td>
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<tr>
<td>FDSC 417 Seminar</td>
<td>FDSC 418 Seminar</td>
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<td>Minor²</td>
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</table>

1To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2Students who make a satisfactory score on the Mathematics Test, Level II (Standard) may schedule other mathematics courses or electives in lieu of MTHSC 105.
3To be selected from the following: ED 302, HIST 101, 102, 172, 173, PHIL 201, 325, POSC 101, PSYCH 201, RS 301, 401, SOC 201.
4See adviser for available minors and course requirements.

134 Total Semester Hours
PLANT SCIENCES

The Plant Sciences major includes four curricula—Agronomy (Crops and Soils), Horticulture (Fruit and Vegetable), Horticulture (Ornamental), and Horticulture (Turfgrass).

AGRONOMY (CROPS AND SOILS) MAJOR

Agronomy is the science that deals with crops and soils. Crop science includes plant breeding and genetics as related to crop improvement and variety introductions. Soil science is concerned with land use, soil physics, chemistry, microbiology, management, and fertility. Emphasis is placed on the science of weed control and management for field forage, and pasture crops.

The science of agronomy is basic to all agriculture, and the graduate may find employment opportunities available with federal, state, and private agencies. Agronomists are employed with agri-chemical, seed, and other industries in technical, supervisory, and sales positions, while some agronomists return to the farm either as manager or owner-manager.

Students majoring in Agronomy (Crops and Soils) will declare a minor in Business, International Agriculture, Production, Science, or a Second Department.

**FRESHMAN YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGRIC 103 Intro. to Animal Ind. .......... 3 (2,3)</td>
<td>AGEC 202 Agric. Economics .......... 3 (3,0)</td>
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<tr>
<td>or AGRIC 104 Intro. to Plant Sci. .......... 3 (2,3)</td>
<td>AGRIC 104 Intro. to Plant Science .......... 3 (2,3)</td>
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<td>CH 101 General Chemistry .......... 4 (3,3)</td>
<td>or AGRIC 103 Intro. to Animal Ind. .......... 3 (2,3)</td>
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<td>ENGL 101 English Composition .......... 3 (3,0)</td>
<td>CH 102 or 112 General Chemistry .......... 4 (3,3)</td>
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<td>MTHS 105 Algebra and Trig.2 .......... 5 (5,0)</td>
<td>ENGL 102 English Composition .......... 3 (3,0)</td>
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<td>Social Science Elective4 .......... 3</td>
<td>Social Science Elective4 .......... 3</td>
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<tr>
<td><strong>Total</strong> .......... 15</td>
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**SOPHOMORE YEAR**

<table>
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<th>First Semester</th>
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<tbody>
<tr>
<td>BIOL 103, General Biology I .......... 3 (3,0)</td>
<td>AGRON 202 Soils .......... 3 (2,2)</td>
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<td>BIOL 105 General Biology Lab. I .......... 1 (0,3)</td>
<td>BIOL 104 General Biology II .......... 3 (3,0)</td>
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<td>CH 223 Organic Chemistry .......... 3 (3,0)</td>
<td>BIOL 106 General Biology Lab. II .......... 1 (0,3)</td>
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<td>and CH 227 Organic Chem. Lab. .......... 1 (0,3)</td>
<td>ENGL 231 Intro. to Journalism .......... 3 (3,0)</td>
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<td>or BIOC 210 Elem. Biochem. .......... 4 (3,3)</td>
<td>or ENGL 301 Pub. Speaking .......... 3 (3,0)</td>
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<td>or CH 201 General Chemistry .......... 4 (3,3)</td>
<td>or ENGL 304 Adv. Comp. .......... 3 (3,0)</td>
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<tr>
<td>or PHYS 207 General Phys. I .......... 4 (3,2)</td>
<td>Elective .......... 2</td>
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<td>Literature Requirement1 .......... 3 (3,0)</td>
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<td>Elective .......... 3-4</td>
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**JUNIOR YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
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<tbody>
<tr>
<td>AGRON 301 Fertilizers5,6 .......... 3 (3,0)</td>
<td>AGRON 422 Field Crops—Dicots5 .......... 3 (3,0)</td>
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<tr>
<td>AGRON 421 Field Crops—Monocots and Specialty Crops5 .......... 3 (3,0)</td>
<td>AGRON 423 Field Crops—Forages5,6 .......... 3 (3,0)</td>
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<tr>
<td>BOT 421 Plant Physiology .......... 4 (3,3)</td>
<td>AGRON 424 Adv. Field Crops Lab5 .......... 1 (0,2)</td>
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<tr>
<td>GEN 302 Genetics .......... 4 (3,3)</td>
<td>AGRON 475 Soil Phys. and Ch.5,6 .......... 3 (2,3)</td>
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<tr>
<td>MICRO 305 General Microbiology .......... 4 (3,3)</td>
<td>Minor6 .......... 3</td>
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<tr>
<td>or PLPA 401 Plant Pathology .......... 3 (2,2)</td>
<td>Social Science Elective4 .......... 3</td>
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<td><strong>Total</strong> .......... 18-17</td>
<td><strong>Total</strong> .......... 16</td>
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</table>
HORTICULTURE (FRUIT AND VEGETABLE) MAJOR

This curriculum provides the student with a basic education in science and the humanities, and the application of both in the scientific, technical, and business phases of the fruit and vegetable industry. Opportunities in this field of study include vegetable and fruit farm management; inspection of fresh fruit, vegetable and other food products as well as nursery stock. There are many other opportunities as in plant breeding, agricultural extension service work, horticultural research, horticultural teaching and writing, and fruit and vegetable processing. Other occupations include sales and fieldwork with seedsmen and nurserymen, and manufacturers of food, fertilizer, and pesticide products.

Students majoring in the fruit and vegetable phase of Horticulture may choose a minor in Business, Environmental Science, International Agriculture, Production, Science, or a Second Department.

FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
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<tbody>
<tr>
<td>AGRIC 103 Intro. to Animal Ind. .....</td>
<td>BIOL 104 General Biology II ............</td>
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<tr>
<td>AGRIC 104 Intro. to Plant Science ...</td>
<td>BIOL 106 General Biology Lab. II .....</td>
</tr>
<tr>
<td>BIOL 103 General Biology I ..........</td>
<td>CH 102 or 112 General Chemistry ...</td>
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<tr>
<td>BIOL 106 General Biology Lab. I .....</td>
<td>ENGL 102 English Composition .......</td>
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<td>CH 101 General Chemistry ...........</td>
<td>MTHSC 105 Algebra and Trig.2 ........</td>
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<td>ENGL 101 English Composition .......</td>
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SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
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<tbody>
<tr>
<td>AGEC 202 Agric. Economics .....</td>
<td>ENGL 231 Intro. to Journalism ..........</td>
</tr>
<tr>
<td>AGRON 202 Soils .....</td>
<td>or ENGL 301 Pub. Speaking ............</td>
</tr>
<tr>
<td>CH 223 Organic Chemistry .....</td>
<td>or ENGL 304 Adv. Comp. ...............</td>
</tr>
<tr>
<td>and CH 227 Organic Chem. Lab. 1</td>
<td>ENT 301 General Entomology ..........</td>
</tr>
<tr>
<td>or BIOCH 210 Elem. Biochem. ......</td>
<td>PHYS 207 General Physics I ...........</td>
</tr>
<tr>
<td>or CH 201 General Chemistry ......</td>
<td>Social Science Elective3 .............</td>
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<tr>
<td>HORT 201 General Horticulture ...</td>
<td>Elective ..........................</td>
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<tr>
<td>Literature Requirement1 .......</td>
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<tr>
<td>........................................</td>
<td>16</td>
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</table>

*To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

*Students who make a satisfactory score on the Mathematics Test, Level II (Standard) may schedule other mathematics courses or mathematics-related courses in lieu of MTHSC 105. (See adviser for electives.)

*See adviser for available minors and course requirements.

*To be selected from the following: ED 302, GEOG 101, 301, 302, HIST 101, 102, 172, 173, PHIL 201, 325, POSC 101, PSYCH 201, RS 301, 401, SOC 201.

*Science minors select 13 credits from these courses.

*Students other than Science minors select 6 courses from the following: AGRON 301, 403, 405, 407, 423, 425, 475, 490.
JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Hours</th>
<th>Hours</th>
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<tbody>
<tr>
<td>HORT 302 Prin. of Veg. Prod.</td>
<td>3 (2.3)</td>
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</tr>
<tr>
<td>HORT 305 Plant Propagation</td>
<td>3 (2.3)</td>
<td></td>
</tr>
<tr>
<td>HORT 352 Commercial Pomology</td>
<td>3 (2.3)</td>
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</tr>
<tr>
<td>HORT 455 Small Fruit and Nut</td>
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<tr>
<td>Social Science Elective</td>
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SENIOR YEAR

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Hours</th>
<th>Hours</th>
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<tbody>
<tr>
<td>HORT 409 Seminar</td>
<td>1 (1.0)</td>
<td>1 (1.0)</td>
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<tr>
<td>HORT 464 Postharvest</td>
<td>3 (2.2)</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>PLPA 401 Plant Pathology</td>
<td>3 (2.2)</td>
<td>6</td>
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<tr>
<td>Minor</td>
<td>4</td>
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</tr>
</tbody>
</table>

134 Total Semester Hours

To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2 Students who make a satisfactory score on the Mathematics Test, Level II (Standard) may schedule other mathematics courses or electives in lieu of MTHSC 105.
3 To be selected from the following: ED 302, GEOG 101, 301, 302, HIST 101, 102, 172, 173, PHIL 201, 325, POSC 101, PSYCH 201, RS 301, 401, SOC 201.
4 See adviser for available minors and course requirements.
5 To be selected from the following: HORT 303, 304, 308, 310, 406, 407, 412, 413, 414, 416, 454, 461, 470, 471.

HORTICULTURE (ORNAMENTAL) MAJOR

This curriculum is designed to give students a scientific background and technical facilities in the field of ornamental horticulture. Subject matter covers plant materials culture, uses, and planning of ground spaces.

Graduates find careers in nursery work, floriculture, landscape designing, landscape contracting, and park supervision. Other occupations are research personnel, teachers, extension workers, and representatives of fertilizer, machinery, and chemical companies.

Students desiring to major in Ornamental Horticulture may choose a minor in Business, International Agriculture, Production, Science, or a Second Department.

FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>BIOL 103 General Biology I</td>
<td>AGRIC 104 Intro. to Plant Science</td>
</tr>
<tr>
<td>BIOL 105 General Biology Lab. I</td>
<td>BIOL 104 General Biology II</td>
</tr>
<tr>
<td>CH 101 General Chemistry</td>
<td>BIOL 106 General Biology Lab. II</td>
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<tr>
<td>ENGL 101 English Composition</td>
<td>CH 102 General Chemistry</td>
</tr>
<tr>
<td>MTHSC 105 Algebra and Trigonometry&lt;sup&gt;2&lt;/sup&gt;</td>
<td>ENGL 102 English Composition</td>
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<tr>
<td></td>
<td>Elective</td>
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SOPHOMORE YEAR

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<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>AGM 301 Soil and Water Cons.</td>
<td>AEGC 202 Agric. Economics</td>
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<tr>
<td>CH 223 Organic Chemistry</td>
<td>AGRON 202 Soils</td>
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<tr>
<td>and CH 227 Organic Chem. Lab.</td>
<td>ENGL 231 Intro. to Journalism</td>
</tr>
<tr>
<td>or BIOCH 210 Elem. Biochem.</td>
<td>or ENGL 301 Pub. Speaking</td>
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<tr>
<td>or CH 201 General Chem.</td>
<td>or ENGL 304 Adv. Comp.</td>
</tr>
<tr>
<td>HORT 201 General Horticulture</td>
<td>ENT 301 General Entomology</td>
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<tr>
<td>HORT 303 Plant Materials I</td>
<td>HORT 304 Plant Materials II</td>
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<tr>
<td>Literature Requirement&lt;sup&gt;1&lt;/sup&gt;</td>
<td>PHYS 207 General Physics I</td>
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<sup>1</sup>To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.<n><sup>2</sup>Students who make a satisfactory score on the Mathematics Test, Level II (Standard) may schedule other mathematics courses or electives in lieu of MTHSC 105.<n><sup>3</sup>To be selected from the following: ED 302, GEOG 101, 301, 302, HIST 101, 102, 172, 173, PHIL 201, 325, POSC 101, PSYCH 201, RS 301, 401, SOC 201.<n><sup>4</sup>See adviser for available minors and course requirements.<n><sup>5</sup>To be selected from the following: HORT 303, 304, 308, 310, 406, 407, 412, 413, 414, 416, 454, 461, 470, 471.
HORTICULTURE (TURFGRASS) MAJOR

The Turfgrass curriculum is designed to prepare the student for a career in the turfgrass industry. The major course of study is supported by a complement of courses to provide the student with a strong background in plant and soil sciences and broad training in the basic sciences and humanities.

Employment opportunities include positions in the design, establishment, and maintenance of fine turf areas for functional, recreational, and ornamental uses. Turfgrass graduates also find rewarding careers as teachers, extension agents, and research technicians. Other opportunities are available in the servicing and sale of specialized turfgrass equipment, fertilizers, chemicals, seed, and sod.

Students majoring in Turfgrass may choose a minor in Business, Environmental Science, International Agriculture, Production Science, or a Second Department.

FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>BIOL 103 General Biology I</td>
<td>AGRIC 104 Intro. to Plant Science ...</td>
</tr>
<tr>
<td>BIOL 105 General Biology Lab. I</td>
<td>BIOL 104 General Biology II</td>
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<tr>
<td>CH 101 General Chemistry</td>
<td>BIOL 106 General Biology Lab. II</td>
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<tr>
<td>ENGL 101 English Composition</td>
<td>CH 102 or 112 General Chemistry ...</td>
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<tr>
<td>MTHSC 105 Algebra and Trigonometry²</td>
<td>ENGL 102 English Composition ...</td>
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### Sophomore Year

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<tr>
<td>AGM 205 Principles of Farm Shop</td>
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<tr>
<td>CH 223 Organic Chemistry</td>
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<tr>
<td>and CH 227 Org. Chem. Lab.</td>
<td>1 (0.3)</td>
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<tr>
<td>or BIOCH 210 Elem. Biochem.</td>
<td>4 (3.3)</td>
</tr>
<tr>
<td>or CH 201 General Chemistry</td>
<td>4 (3.3)</td>
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<tr>
<td>HORT 201 General Horticulture</td>
<td>3 (2.2)</td>
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<tr>
<td>HORT 303 Plant Materials I</td>
<td>3 (2.3)</td>
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<tr>
<td>Literature Requirement(^1)</td>
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<tr>
<td>AGEC 202 Agric. Economics</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>AGM 301 Soil and Water Cons.</td>
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<tr>
<td>AGRON 202 Soils</td>
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<td>ENGL 231 Intro. to Journalism</td>
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<tr>
<td>or ENGL 301 Pub. Speaking</td>
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<td>or ENGL 304 Adv. Comp.</td>
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<tr>
<td>ENT 301 General Entomology</td>
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<td>PHYS 207 General Physics I</td>
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### Junior Year

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<tr>
<td>AGRON 407 Principles of Weed Control</td>
<td>3 (2.2)</td>
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<tr>
<td>HORT 305 Plant Propagation</td>
<td>3 (2.3)</td>
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<tr>
<td>HORT 412 Turfgrass Management</td>
<td>3 (2.3)</td>
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<tr>
<td>Social Science Elective(^3)</td>
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<td>Elective</td>
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<td><strong>Total</strong></td>
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### Senior Year

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<tr>
<td>GEN 302 Genetics</td>
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<tr>
<td>HORT 409 Seminar</td>
<td>1 (1.0)</td>
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<tr>
<td>Horticulture Elective(^5)</td>
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<tr>
<td>Minor(^4)</td>
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<tr>
<td><strong>Total</strong></td>
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</tbody>
</table>

**134 Total Semester Hours**

\(^1\)To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

\(^2\)Students who make a satisfactory score on the Mathematics Test, Level II (Standard) may schedule other mathematics courses or electives in lieu of MTHSC 105.

\(^3\)To be selected from the following: ED 302, GEOG 101, 301, 302, HIST 101, 102, 172, 173, PHIL 201, 325, POSC 101, PSYCH 201, RS 301, 401, SOC 201.

\(^4\)See adviser for available minors and course requirements.

\(^5\)To be selected from the following: HORT 302, 304, 308, 310, 352, 406, 407, 414, 416, 454, 455, 456, 461, 462, 470, 471.

### Preveterinary Medicine

Under a regional plan, the South Carolina Preveterinary Advisory Committee coordinates a program for all South Carolina residents who are interested in pursuing a career in veterinary medicine. South Carolina residents attending any college or university may apply through the South Carolina Advisory Committee to the University of Georgia College of Veterinary Medicine. Currently, the University of Georgia admits thirteen students each year through arrangements with the Southern Regional Education Board.

Tuskegee Institute in Alabama also has an excellent program in Veterinary Medicine. Applicants to Tuskegee Institute may apply directly to the Institute. Tuskegee currently admits four South Carolina students each year.

Minimum requirements for admission to a college of veterinary medicine generally include the satisfactory completion of a minimum of two years of college in a well-rounded undergraduate degree program. Specific requirements for admission to the University of Georgia College of Veterinary Medicine include the following un-
Undergraduate courses: eight semester credits each of English and physics, twelve semester credits of biology and sixteen semester credits of organic and inorganic chemistry. (Chemistry and physics courses must be at the premedical level. They may not be survey courses.) In addition, four semester credits each of microbiology and biochemistry, including laboratories, and three semester credits of animal nutrition are required, but this may be satisfied after enrollment in the College of Veterinary Medicine.

In addition, the South Carolina Preveterninary Committee recommends that in order to be in the best possible competitive position, the applicant complete courses in animal agriculture, genetics, nutrition, biochemistry, and advanced biology subjects. Considerations for selection are character, scholastic achievements, personality, health, experience with animals, general knowledge, and motivation. In the past, competition has been very keen and only those applicants who have shown exceptional ability have been admitted. Specific considerations may include a minimal grade-point average and completion of standardized tests such as the Graduate Record Examination and the Veterinary Aptitude Test.

Since out-of-state students attending Clemson University are ineligible to apply to Georgia or Tuskegee under the South Carolina quota, they should contact and subsequently satisfy the entrance requirements of the specific college(s) of veterinary medicine to which they plan to apply.

Veterinary schools accept students with a broad range of academic backgrounds; therefore, it is recommended that the beginning university student select any undergraduate major and simultaneously complete the courses required for veterinary school entrance and those required for completion of a BS or BA degree. For students selecting Animal Science, Dairy Science, Economic Zoology, or Poultry Science in the College of Agricultural Sciences and Zoology in the College of Sciences at Clemson University, the basic curricula have been designed to satisfy Georgia’s entrance requirements. For further information, contact the chairperson of the Preveterninary Medicine Curriculum Committee.
COLLEGE OF ARCHITECTURE

The Clemson University College of Architecture provides coordinated preprofessional and professional degree programs at undergraduate and graduate levels in preparation for careers in Architecture, City and Regional Planning, Visual Arts, and Building Science. These curricula are not offered elsewhere in the State. The preprofessional offerings of the College also provide an excellent basis for graduate studies in Landscape Architecture and Art and Architectural History.

The College enjoys contracts for creative research and public service in several areas and receives an annual support budget from the Clemson Architectural Foundation to enrich its programs. It is a member of the Association of Collegiate Schools of Architecture, the Associated Schools of Construction, American Planning Association, and is accredited by the National Architectural Accrediting Board and the Association of Collegiate Schools of Planning.

The Architectural Foundation, a nonprofit corporation, was established in January 1956 under the Laws of the State of South Carolina and under the sponsorship of the South Carolina Chapter of the American Institute of Architects to facilitate the continuous improvement of architectural and planning education and of the art and technology of building in South Carolina by providing financial and other assistance to the College of Architecture at Clemson University. By this means students in the College of Architecture at Clemson have been able to enjoy instruction, facilities, and conditions of superior quality.

The advantages to the students evolving from the Clemson Architectural Foundation are many. Among these are the programs of celebrated guest critics and lecturers, excellent exhibits of many types—paintings, sculpture, architecture, construction, furniture, ceramics, textiles and other allied arts and crafts—traveling expenses for student field trips and professional activities, and student loans and grants. Visual-aid facilities and gifts to the library are examples of permanent assets provided through Foundation support.

The Clemson Architectural Foundation provides an Overseas Center for Building Research and Urban Study in Genoa, Italy. Graduate students in Architecture, City and Regional Planning, and Visual Arts and fourth-year students in Building Science and Management are involved in an intensive one-semester program in the center annually.

The College of Architecture is housed in a modern building complex constructed for its program in 1958 with a major addition completed in 1974. The requisite functions are provided on four levels and arranged around two landscaped courts. The physical facilities reflect the teaching philosophy of the College with working studios related to the Resource Center and the Rudolph Lee Gallery at the building core. The Resource Center houses the rapidly expanding art and architectural library, encompassing a collection of approxi-
mately 85,000 slides, over 20,000 volumes, and subscribes to 262 periodicals on art, architecture, building technology, and planning, along with additional materials for student reference, urban and rural maps, manufacturers’ samples, and videotape equipment. The Rudolph Lee Gallery, open to the public, offers fifteen or more exhibitions annually. These include international shows, as well as works of faculty and students in the College of Architecture. Studios for printmaking, sculpture, painting, photography, and graphic design are appropriately equipped. Building science studios are designed for the production of related studies including construction management and the construction and display of structural models, microfilm viewing, and other graphic aids. A large shop has excellent power tools for wood and metal, hand tools, and benches for construction of light architectural design models and for heavier work related to the curriculum in visual arts. The College has access to a pilot plant for the construction of full-scale building prototypes or their components.

ENTRANCE REQUIREMENTS

In the interest of both students and the conservation of University resources and to maintain a program on the highest level, admission to the College of Architecture must necessarily be on a selective basis. Annual enrollment quotas are established consistent with space available. Selection considerations include secondary school record and performance in the College Board examination (SAT Test).

Students wishing admission are advised to make application to the University early in the fall of their senior year in high school and to make arrangements for a personal interview with the Dean of the College or department head as early as possible in the year before admission. The Admissions Committee of the College will further interview entering students during freshman matriculation week of each academic year.

PROGRAMS OF STUDY

ARCHITECTURE

The architect as a practicing professional has the creative responsibility of designing the buildings which shape our physical environment. To understand the humanistic, economic and technological nature of environmental problems, he must have a sound general education. His subsequent professional education must prepare him for a life of continuing change, in which problems to be solved will be large and small, for every sort of function, in every type of climate and for every condition of budget.

The curriculum in Architecture is six years in length, embracing either a four-year Bachelor of Arts in Design program or a four-year
Bachelor of Science in Design sequence followed by two years of graduate study. All students in the college undertake the same beginning two-year matrix. The Design sequences include a minimum of 135 credit hours of study, and an additional 60 hours in the graduate program for a total of 194 credits leading to the first professional degree, Master of Architecture.

The Bachelor of Architecture program is available to a limited number of students who have completed a first degree in Design or its equivalent and who show professional promise. Admission to this program will be with the approval of the College of Architecture Admissions Committee.

BUILDING SCIENCE AND MANAGEMENT

The nation's leading industry in terms of annual dollar volume is building construction. Building contracting is a dynamic field and although organizations vary considerably in type, size, and complexity, those in leadership positions must invariably have capability (education) in management, construction science, relevant technical disciplines, and the humanities. The curriculum in Building Science and Management has been structured to provide young people with the unique balance of studies needed to equip them for key roles in the industry. The course is four years in length and leads to the Bachelor of Science degree in Building Science and Management.

CITY AND REGIONAL PLANNING

The city planner is a member of an essential and complex profession concerned with the programming and guiding of urban and regional development. Our expanding society presents unusual opportunities for Planning graduates in private firms and on public agency staffs. When asked what made a good planner, a leading British professional replied, "A sensitive, creative leader who has lived a bit." He must be able to integrate recommendations of a wide range of specialists. The sociologist, economist, traffic engineer, and ecologist play significant roles in urban growth and change, but the city planner and urban designer must bring the city to physical form with balance and imagination.

Students admitted as candidates for the Master of City and Regional Planning degree must have the following qualifications: (1) meet the admissions requirements for the University Graduate School; and (2) have a baccalaureate degree approved by the school in such fields as architecture, civil engineering, economics, landscape architecture, law, political science, or sociology.

Candidates entering the curriculum from a nondesign discipline will be required to take a special parallel course designed for their needs, and accordingly may be excused from courses in which they have achieved proficiency.
HISTORY AND VISUAL STUDIES

The Department of History and Visual Studies provides required undergraduate courses in architectural and art history and visual arts. The Department also offers a two-year graduate program leading to the Master of Fine Arts degree in Ceramics, Painting, Sculpture, Printmaking, Graphic Design, Photography, and Multimedia. Each of these programs requires a minimum of 60 credit hours. The graduate curricula have an emphasis in creative professional work of high standard. Maximum flexibility is provided in the management of these courses to foster innovative and imaginative solutions to fine arts projects.

BACHELOR OF ARTS IN DESIGN

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FIRST YEAR</td>
</tr>
<tr>
<td>CAAH 115 Hist. of Art and Arch. I ...</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>CADS 151 Design Studies ..........</td>
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</tr>
<tr>
<td>ENGL 101 English Composition ....</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 106 Cal. of One Var. I ......</td>
<td>4 (4.0)</td>
</tr>
<tr>
<td>Modern Language ..................</td>
<td>4 (3.1)</td>
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<tr>
<td>Total Semester Hours ..........</td>
<td>18</td>
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|                | SECOND YEAR      |                |
| CAAH 215 Hist. of Art and Arch. III .. | 3 (3.0) | CAAH 216 Hist. of Art and Arch. IV . | 3 (3.0) |
| CABS 201 Building Science ....... | 3 (2.3) | CABS 202 Building Science ........ | 3 (2.3) |
| CADS 251 Design Studies .......... | 5(0,15) | CADS 252 Design Studies .......... | 5(0,15) |
| Modern Language .................. | 3 (3.0) | Modern Language .................. | 3 (3.0) |
| Visual Arts1 .................... | 3 (1.6) | Visual Arts1 .................... | 3 (1.6) |
| Total Semester Hours .......... | 17 | 17 |

|                | THIRD YEAR       |                |
| CADS 351 Design Studies .......... | 5(0,15) | CADS 352 Design Studies .......... | 5(0,15) |
| Literature Requirement2 .......... | 3 (3.0) | Literature Requirement2 .......... | 3 (3.0) |
| Major Studies3 .......... | 6 | Major Studies3 .......... | 6 |
| Elective .......... | 3 | Elective .......... | 3 |
| Total Semester Hours .......... | 17 | 17 |

|                | FOURTH YEAR      |                |
| CADS 451 Design Studies .......... | 5(0,15) | CADS 452 Design Studies .......... | 5(0,15) |
| Major Studies3 .......... | 9 | Major Studies3 .......... | 9 |
| Elective .......... | 3 | Elective .......... | 3 |
| Total Semester Hours .......... | 17 | 17 |

1 CAVA 205, 207, 209, 211, 213, 215, 217.
2 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
3 See footnote 3. Major Studies, under the Bachelor of Science in Design curriculum.
## BACHELOR OF SCIENCE IN DESIGN

### FIRST YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>CAAH 115 Hist. of Art and Arch. I</td>
<td>CAAH 116 Hist. of Art and Arch. I</td>
</tr>
<tr>
<td>CADS 151 Design Studies</td>
<td>CADS 152 Design Studies</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>MTHSC 106 Cal. of One Var. I</td>
<td>MTHSC 301 Statistical Theory and Methods I</td>
</tr>
<tr>
<td>PHYS 115 Classical Physics I</td>
<td>PHYS 116 Classical Physics II</td>
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<td><strong>Total:</strong> 16 credits</td>
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### SECOND YEAR

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<tr>
<td>CAAH 215 Hist. of Art and Arch. III</td>
<td>CAAH 216 Hist. of Art and Arch. IV</td>
</tr>
<tr>
<td>CABS 201 Building Science</td>
<td>CABS 202 Building Science</td>
</tr>
<tr>
<td>CADS 251 Design Studies</td>
<td>CADS 252 Design Studies</td>
</tr>
<tr>
<td>ECON 211 Prin. of Economics</td>
<td>ECON 212 Prin. of Economics</td>
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<tr>
<td>Visual Arts</td>
<td>Visual Arts</td>
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<td></td>
<td><strong>Total:</strong> 17 credits</td>
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### THIRD YEAR

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<table>
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<th></th>
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<tbody>
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<tr>
<td>Literature Requirement</td>
<td>Literature Requirement</td>
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<td>Major Studies</td>
<td>Major Studies</td>
</tr>
<tr>
<td>Elective</td>
<td>Elective</td>
</tr>
<tr>
<td></td>
<td><strong>Total:</strong> 17 credits</td>
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### FOURTH YEAR

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<table>
<thead>
<tr>
<th></th>
<th></th>
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<tbody>
<tr>
<td>CADS 451 Design Studies</td>
<td>CADS 452 Design Studies</td>
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<tr>
<td>Major Studies</td>
<td>Major Studies</td>
</tr>
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<td>Elective</td>
<td>Elective</td>
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<td><strong>Total:</strong> 17 credits</td>
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<td><strong>135 Total Semester Hours</strong></td>
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</tbody>
</table>

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1 ECON 200 and a 300-level economics course may be substituted for ECON 211, 212.
2 CAVA 205, 207, 209, 211, 213, 215, 217.
3 Major Studies.

The undergraduate programs in Design in the College of Architecture are preparatory to professional study in Architecture, City and Regional Planning, Visual Arts, and Landscape Architecture. Major studies in the third and fourth years consist of 20 credits of Design Studies and 30 credits of coursework to be designated for each professional area as follows:

- Architecture (General): 20 credits of Design Studies with emphasis in Architectural Design; 15 credits to be selected from the following: CAAH 403, CABS 303, 304, 403, 404; 15 credits of approved electives.
- Architecture (Administration): Same as above, except that approved electives are to be selected from the following: ACCT 200, CPSC 110, FIN 306, LAW 312, 3 credits of approved electives.
- Architecture (Health Care Facilities): Same as Architecture (General), except that two of the approved electives would be CAAH 485 and HADM 308.
- Landscape Architecture: 20 credits of Design Studies with emphasis in Landscape Architecture; 15 credits to be selected from the following: AGM 301, 460, CABS 304, 403, HORT 303; 15 credits of approved electives.
- Planning: 20 credits of Design Studies with emphasis in Planning; 30 credits of approved electives.
- Visual Arts: 20 credits of Design studies with emphasis in Visual Arts; 15 credits to be selected from CAAH 400-level courses and CAVA 200-, 300-, or 400-level courses; 15 credits of approved electives.

---

# BACHELOR OF ARCHITECTURE

See Design curricula (Bachelor of Arts or Bachelor of Science)

### FIFTH YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAAH 405 Hist. of Plan. and</td>
<td>CAAR 481 Arch. Office Practice</td>
</tr>
<tr>
<td>Cities</td>
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<tr>
<td>CAAR 557 Arch. Design</td>
<td>CAAR 558 Arch. Design</td>
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<tr>
<td>Elective</td>
<td>Elective</td>
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1 To be selected from: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
### SIXTH YEAR

**First Semester**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CAAH 403</td>
<td>Hist. of Mod. Arch. Movement</td>
<td>3</td>
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<tr>
<td>CAAR 559</td>
<td>Terminal Project in Architecture</td>
<td>9(1,24)</td>
</tr>
<tr>
<td>Elective</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives shall be determined by each individual student in consultation with his major adviser to complement and reinforce the student's planned area of study.**

### BACHELOR OF SCIENCE IN BUILDING SCIENCE AND MANAGEMENT

#### FIRST YEAR

**First Semester**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAAH 115</td>
<td>Hist. of Art and Arch. I</td>
<td>3</td>
</tr>
<tr>
<td>CADS 151</td>
<td>Design Studies</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 101</td>
<td>English Composition</td>
<td>3</td>
</tr>
<tr>
<td>MTHSC 106</td>
<td>Cal. of One Var. I</td>
<td>4</td>
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<tr>
<td>PHYS 115</td>
<td>Classical Physics</td>
<td>3</td>
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</table>

17

**Second Semester**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>CAAH 116</td>
<td>Hist. of Art and Arch. II</td>
<td>3</td>
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<tr>
<td>CADS 152</td>
<td>Design Studies</td>
<td>4</td>
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<tr>
<td>ENGL 102</td>
<td>English Composition</td>
<td>3</td>
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<tr>
<td>MTHSC 301</td>
<td>Statistical Theory and Methods</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 116</td>
<td>Classical Physics</td>
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16

#### SECOND YEAR

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<thead>
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<th>Credits</th>
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<tbody>
<tr>
<td>CAAH 215</td>
<td>Hist. of Art and Arch. III</td>
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<tr>
<td>CABS 201</td>
<td>Building Science</td>
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</tr>
<tr>
<td>CADS 251</td>
<td>Design Studies</td>
<td>5(0,15)</td>
</tr>
<tr>
<td>ECON 200</td>
<td>Economic Concepts</td>
<td>3</td>
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<tr>
<td>Visual Arts</td>
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17

#### THIRD YEAR

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CABS 311</td>
<td>Contract Documents</td>
<td>3</td>
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<tr>
<td>CABS 351</td>
<td>Construction Mgt. I</td>
<td>3</td>
</tr>
<tr>
<td>English Requirement</td>
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<td>3</td>
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<tr>
<td>Major Studies</td>
<td></td>
<td>6</td>
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<tr>
<td>Elective</td>
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18

#### FOURTH YEAR

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CABS 411</td>
<td>Construction Equipment</td>
<td>3</td>
</tr>
<tr>
<td>CABS 451</td>
<td>Construction Mgt. III</td>
<td>3</td>
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<tr>
<td>Major Studies</td>
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<td>9</td>
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<tr>
<td>Elective</td>
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</tr>
</tbody>
</table>

18

136 Total Semester Hours

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1 CAVA 205, 207, 209, 211, 213, 215, 217.
2 ENGL 202, 203, 204, 205, 206, 207, 208, 209, 301.
3 Major Studies: CABS 303, 304, 404, CE 201, CPSC 120, ECON 305, LAW 312, plus 6 hours of electives. (27 total credit hours.)
COLLEGE OF EDUCATION

The purpose of the College of Education is to prepare teachers, special services personnel, and school leaders; to provide professional services to education in South Carolina; and to carry out basic and applied research in education. Curricula are organized to give students the opportunities to (1) acquire a broad general education through liberal arts and science courses; (2) develop depth of knowledge in the teaching area; (3) gain an understanding of the historical, philosophical and psychological backgrounds of American education; and (4) acquire knowledge of and skill and experience in using effective teaching techniques.

Curricula for those preparing to teach have been especially designed by committees from each department offering a teaching major and the College of Education.

ADMISSION

Admission to programs in the College of Education is accomplished in three phases: preprofessional, professional, and directed teaching.

Preprofessional  Individuals who show an interest in teaching and related areas and who have met the general admission requirements of Clemson University must complete and submit form CED03 to be considered for admission to a preprofessional program.

Professional  During the term in which a student is to complete 60 semester hours of work, he/she must have a minimum cumulative grade-point average of 1.6 and apply on form CED03 for admission to a professional program in the College of Education. This application is to be submitted to his/her department head by November 10, March 1, or at the beginning of the summer school term in which he/she will have completed 60 semester hours. Effective with the fall of 1977-78 class of freshmen, students are required to have a minimum cumulative grade-point average of 1.8 or higher for admission to a professional program.

Directed Teaching  A student who is in a professional program and who has completed at least 95 semester hours is eligible to register for the appropriate directed teaching program. A student should apply to the head of his/her department prior to May 1 of the academic year preceding the school year in which directed teaching is to be scheduled. The cumulative grade-point average necessary for graduation is required prior to being permitted to register for directed teaching and the related methods courses.

CONTINUING ENROLLMENT

A student must maintain the grade-point average for admission to the program and that required by Clemson University for continuing
enrollment. Grade-point averages may be checked at the end of a semester or summer term. A student must have a cumulative grade-point average of 1.6 to enroll in 300-level and 1.8 to enroll in 400-level education courses, except directed teaching and the related methods course which require a minimum of 2.0. Effective with the fall of 1977-78 class of freshmen, students are required to have a cumulative grade-point average of 1.8 or higher to enroll in 300-level education courses and 2.0 or higher to register in all 400-level education courses.

Any student who desires to enroll in education courses must meet the cumulative grade-point requirements established for Education majors.

A student who is denied admission may appeal to the College of Education Admissions Committee.

A comprehensive statement of the activities, services, and programs of the College of Education is published in the Student Handbook which is distributed by faculty advisers to Education majors and students interested in education.

GRADUATE STUDY

The College of Education offers programs leading to the Master of Agricultural Education, Master of Education, Master of Industrial Education, and the Specialist in Education degrees.

BACHELOR OF ARTS CURRICULA

EARLY CHILDHOOD EDUCATION AND ELEMENTARY EDUCATION PROGRAMS

A total of 130 semester hours is required for the Bachelor of Arts degree in either the Early Childhood Education or the Elementary Education curriculum. The Early Childhood Education curriculum prepares the student for teaching positions in kindergarten or grades one through three. The Elementary Education curriculum prepares student for teaching on the elementary school level.

Application to Directed Teaching (ED 481 for Elementary Education and ED 484 for Early Childhood Education) should be made in writing no later than May 1, prior to the school year in which student teaching is to be scheduled. A student whose cumulative grade-point ratio is lower than the requirement for graduation will not be permitted to register for Directed Teaching.
## EARLY CHILDHOOD EDUCATION

### FRESHMAN YEAR

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<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tr>
<td>ED 100 Orientation</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>HIST 101 History of the U.S.</td>
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<tr>
<td>Foreign Language</td>
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<td>Science Mathematical Sciences Requirement2</td>
<td>Science Mathematical Sciences Requirement2</td>
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<tr>
<td>Elective</td>
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<tr>
<td>1 (1.0)</td>
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<td>16</td>
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### SOPHOMORE YEAR

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>HIST 102 History of the U.S.</td>
<td>HIST 172 Western Civilization</td>
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<tr>
<td>Foreign Language</td>
<td>MUS 210 Music Appreciation</td>
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<td>Foreign Language</td>
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<td>1</td>
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<tr>
<td>17</td>
<td>16</td>
</tr>
</tbody>
</table>

### JUNIOR YEAR

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>ED 301 Prin. of American Ed.</td>
<td>ED 334 Child Growth and Dev.</td>
</tr>
<tr>
<td>ED 302 Educational Psychology</td>
<td>ED 459 Skills for Read. Instr.</td>
</tr>
<tr>
<td>ED 466 Curriculum for Early Childhood Education</td>
<td>INED 372 Arts and Crafts</td>
</tr>
<tr>
<td>ENGL 351 Children’s Literature</td>
<td>Social Science Elective3</td>
</tr>
<tr>
<td>HIST 173 Western Civilization</td>
<td>Elective</td>
</tr>
<tr>
<td>Elective</td>
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</tr>
<tr>
<td>3 (3.0)</td>
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<td>15</td>
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### SENIOR YEAR

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CAAH 303 Evol. of Vis. Arts I</td>
<td>ED 336 Behavior of the Preschool Child</td>
</tr>
<tr>
<td>or CAAH 304 Evol. of Vis. Arts II</td>
<td>ED 461 Teaching Reading in the Elementary School</td>
</tr>
<tr>
<td>ED 458 Health Education</td>
<td>ED 483 Methods and Materials for Early Childhood Education</td>
</tr>
<tr>
<td>MUS 400 Music in the Elementary School Classroom</td>
<td>ED 484 Directed Teaching4</td>
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<tr>
<td>Social Science Elective3</td>
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</tr>
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<td>Elective</td>
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<tr>
<td>3 (3.0)</td>
<td>3 (2.3)</td>
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<td>3 (2.3)</td>
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<tr>
<td>130 Total Semester Hours</td>
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</table>

1. To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2. A total of 24 hours is required in mathematics and science (and courses in both biological and physical sciences must be taken) with a minimum of 9 hours in mathematics and a minimum of 12 hours in science. The additional three hours may be taken in either mathematics or science and are to be selected from the courses listed below.
3. Mathematical Sciences to be selected from the following: MTHSC 115, 116, 215, 216.
4. Science to be selected from biological science—BIOL 103, 104, 105, 106; and physical science—astronomy, chemistry, geology, physical science, and physics.
5. Select from economics, geography, philosophy, political science, psychology, religion, sociology.
6. Block schedule must be taken as shown in either semester of the senior year.

## ELEMENTARY EDUCATION

### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED 100 Orientation</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>HIST 101 History of the U.S.</td>
</tr>
<tr>
<td>Foreign Language</td>
<td>Foreign Language</td>
</tr>
<tr>
<td>Mathematical Sciences</td>
<td>Mathematical Sciences</td>
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<td>Requirement2</td>
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SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>HIST 102 History of the U.S.</td>
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<tr>
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<td>Literature Requirement^1</td>
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<td><strong>Total</strong></td>
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JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
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<tbody>
<tr>
<td>ED 301 Prin. of American Ed.</td>
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</tr>
<tr>
<td>ED 302 Educational Psychology</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>ENGL 351 Children's Literature</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>HIST 173 Western Civilization</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Interest Area^1</td>
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<td>Elective</td>
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<td><strong>Total</strong></td>
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SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAAH 303 Evol. of Vis. Arts I or CAAH 304 Evol. of Vis. Arts II</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>ED 458 Health Education</td>
<td>3 (3,0)</td>
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<tr>
<td>Interest Area^3</td>
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<tr>
<td>Social Science Elective^4</td>
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<td><strong>Total</strong></td>
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</table>

130 Total Semester Hours

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

2 A total of 24 hours is required in mathematics and science (and courses in both biological and physical sciences must be taken) with a minimum of 9 hours in mathematics and a minimum of 12 hours in science. The additional three hours may be taken in either mathematics or science and are to be selected from the courses listed below.

Mathematical Sciences to be selected from the following: MTHSC 115, 116, 215, 216.

Science to be selected from biological science—BIOL 103, 104, 105, 106; and physical science—astronomy, chemistry, geology, physical science, and physics.

3 Nine semester hours in one of these areas: English, fine arts, mathematics, modern languages, natural sciences, social sciences, special education.

4 Select from economics, geography, philosophy, political science, psychology, religion, sociology.

5 Block schedule must be taken as shown in either semester of the senior year.

SECONDARY EDUCATION CURRICULA

Programs leading to a Bachelor of Arts degree in Secondary Education are available to students preparing to teach economics, English, history, mathematical sciences, French, German, Spanish, natural sciences, political science, psychology, or sociology on the secondary school level. The teaching field should be selected as early as possible in order that appropriate freshman and sophomore courses may be taken.

Each curriculum requires a major concentration in the teaching field. Specific courses and sequences have been designated by teacher education committees to meet requirements for those planning to teach. Students who have elective courses in the teaching area should consult the departmental adviser prior to scheduling these courses.
The professional education courses should be completed in sequence prior to registering for the block schedule. Application to Directed Teaching (ED 412) should be made in writing no later than May 1 preceding the school year in which student teaching is to be scheduled. A student whose cumulative grade-point ratio is lower than the requirement for graduation will not be permitted to register for Directed Teaching.

Education 412 is conducted on a full-day basis, "block schedule," for one-half semester. Students taking ED 412 will register for ED 335, 424, and 498, these three courses being taught on a five-day basis during the first half of the semester.

### TEACHING AREA: ECONOMICS

#### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED 100 Orientation</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>HIST 173 Western Civilization</td>
</tr>
<tr>
<td>HIST 172 Western Civilization</td>
<td>MTHSC 102 Intro. to Math. Anal.</td>
</tr>
<tr>
<td>MTHSC 101 Finite Probability</td>
<td>Foreign Language</td>
</tr>
<tr>
<td>Foreign Language</td>
<td>Science^2</td>
</tr>
<tr>
<td>Science^1</td>
<td>Elective</td>
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<td>Elective</td>
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<td>18-19</td>
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#### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>ECON 211 Principles of Economics</td>
<td>ACCT 201 Principles of Accounting</td>
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<tr>
<td>Foreign Language</td>
<td>Foreign Language</td>
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<tr>
<td>Literature Requirement</td>
<td>Literature Requirement^1</td>
</tr>
<tr>
<td>Science^2</td>
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<td>Elective</td>
<td>Elective</td>
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<td>17-16</td>
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#### JUNIOR YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED 301 Principles of American Ed.</td>
<td>Teaching Major</td>
</tr>
<tr>
<td>ED 302 Educational Psychology</td>
<td>Elective</td>
</tr>
<tr>
<td>Teaching Major</td>
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</table>

#### SENIOR YEAR

(Block Schedule—Either Semester)

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAAH 303 Evol. of Vis. Arts I</td>
<td>ED 335 Adol. Growth and Dev.</td>
</tr>
<tr>
<td>ED 458 Health Education</td>
<td>ED 412 Directed Teaching^2</td>
</tr>
<tr>
<td>MUS 210 Music Appreciation</td>
<td>ED 424 Methods and Materials in</td>
</tr>
<tr>
<td>Teaching Major</td>
<td>Secondary School Instruction</td>
</tr>
<tr>
<td></td>
<td>ED 498 Secondary Content</td>
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<tr>
<td></td>
<td>Area Reading</td>
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<tr>
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<td>129 Total Semester Hours</td>
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</table>

1. To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2. BIOL 103, 104, 105, 106 and a two-semester sequence in astronomy, chemistry, geology, physical science, or physics.
3. This semester is a block schedule and must be taken as listed.

Note: The teaching major requires twenty-four semester hours of junior and senior courses consisting of ECON 314, 407; nine semester hours from ECON 302, 403, 404, 410, 412, and 420 distributed as follows:

- Group B: Three courses from the following: ECON 302, 403, 404, 410, 412, 420.
### TEACHING AREA: ENGLISH

#### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th></th>
<th>Second Semester</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ED 100 Orientation</td>
<td>1 (1.0)</td>
<td>ENGL 102 English Composition</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>3 (3.0)</td>
<td>HIST 172 Western Civilization</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 101 Finite Probability</td>
<td>3 (3.0)</td>
<td>MTHSC 102 Intro. to Math. Anal.</td>
<td>3 (3.0)</td>
</tr>
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<td>4 (3.1)</td>
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<td>Science</td>
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</tr>
<tr>
<td>Elective</td>
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<td>_</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16</strong></td>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
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#### SOPHOMORE YEAR

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<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>HIST 173 Western Civilization</td>
<td>3 (3.0)</td>
<td>Foreign Language</td>
<td>3 (3.0)</td>
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<td>3 (3.0)</td>
<td>Literature Requirement</td>
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<td>Science</td>
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<td>Science</td>
<td>4</td>
<td>Social Science Elective</td>
<td>3</td>
</tr>
<tr>
<td>Social Science Elective</td>
<td>3</td>
<td>Elective</td>
<td>4</td>
</tr>
<tr>
<td>Elective</td>
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<td>_</td>
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</tr>
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<td><strong>Total</strong></td>
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<td><strong>Total</strong></td>
<td><strong>17</strong></td>
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#### JUNIOR YEAR

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<table>
<thead>
<tr>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>ED 301 Principles of American Ed.</td>
<td>3 (3.0)</td>
<td>ED 302 Educational Psychology</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>HIST 361 History of England</td>
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<td>HIST 363 History of England</td>
<td>3 (3.0)</td>
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<tr>
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<td>Teaching Major</td>
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<td>Elective</td>
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<td>15</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
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#### SENIOR YEAR

(Block Schedule—Either Semester)

<p>| | | | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>CAAA 303 Evol. of Vis. Arts I</td>
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<td>ED 335 Adol. Growth and Dev.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>ED 458 Health Education</td>
<td>3 (3.0)</td>
<td>ED 412 Directed Teaching *</td>
<td>6 (1.15)</td>
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<tr>
<td>MUS 210 Music Appreciation</td>
<td>3 (3.0)</td>
<td>ED 424 Methods and Materials in Secondary School Instruction</td>
<td>3 (3.0)</td>
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</table>
| Teaching Major | 6 | ED 498 Secondary Content | \_

Area Reading | 3 (1.4) |
| **Total** | **15** |
| **131 Total Semester Hours** |        |
## TEACHING AREA: HISTORY

### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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</thead>
<tbody>
<tr>
<td>ED 100 Orientation</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>HIST 172 Western Civilization</td>
</tr>
<tr>
<td>MTHSC 101 Finite Probability</td>
<td>MTHSC 102 Intro. to Math. Anal.</td>
</tr>
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<td>Foreign Language</td>
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<td>Science</td>
<td>Science</td>
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<td>Elective</td>
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<td><strong>Total</strong></td>
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### SOPHOMORE YEAR

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<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>HIST 101 History of the U.S.</td>
<td>HIST 102 History of the U.S.</td>
</tr>
<tr>
<td>HIST 173 Western Civilization</td>
<td>Foreign Language</td>
</tr>
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<td>Foreign Language</td>
<td>Literature Requirement</td>
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<td>Science</td>
<td>Elective</td>
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<td><strong>Total</strong></td>
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</table>

### JUNIOR YEAR

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<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>ED 301 Principles of American Ed.</td>
<td>ED 302 Educational Psychology</td>
</tr>
<tr>
<td>Teaching Major</td>
<td>Teaching Major</td>
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<tr>
<td>Social Science Elective</td>
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### SENIOR YEAR

(Block Schedule—Either Semester)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CAAH 303 Evol. of Vis. Arts I</td>
<td>ED 335 Adol. Growth and Dev.</td>
</tr>
<tr>
<td>ED 458 Health Education</td>
<td>ED 412 Directed Teaching &amp;</td>
</tr>
<tr>
<td>MUS 210 Music Appreciation</td>
<td>ED 424 Methods and Materials in</td>
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<td>Teaching Major</td>
<td>Secondary School Instruction</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>Area Reading</td>
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<table>
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<tbody>
<tr>
<td><strong>Total</strong></td>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

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1. To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2. BIOL 103, 104, 105, 106 and a two-semester sequence in astronomy, chemistry, geology, physical science, or physics.
3. Economics, geography, philosophy, political science, psychology, religion, sociology.
4. This semester is a block schedule and must be taken as listed.

**Note:** The teaching major requires twenty-four hours of junior and senior history courses, with the following number of courses from Groups A, B, C, and D.

### TEACHING AREA: MATHEMATICAL SCIENCES

#### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED 100 Orientation</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>MTHSC 108 Cal. of One Var. II</td>
</tr>
<tr>
<td>MTHSC 106 Cal. of One Var. I</td>
<td>Foreign Language</td>
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<tr>
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<td>Science²</td>
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**Total Semester Hours:** 16-17

#### SOPHOMORE YEAR

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<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>HIST 172 Western Civilization</td>
<td>MTHSC 206 Calculus of Sev. Var.</td>
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<td>CPSC 110 Elem. Comp. Prog.</td>
</tr>
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<td>Foreign Language</td>
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<td>3 (3.0)</td>
<td>HIST 173 Western Civilization</td>
</tr>
<tr>
<td>Literature Requirement¹</td>
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<td>Science²</td>
<td>Science²</td>
<td>4-3</td>
<td>Literature Requirement¹</td>
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<td>Elective</td>
<td>Social Science Elective³</td>
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<td>3</td>
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</table>

**Total Semester Hours:** 18-17

#### JUNIOR YEAR

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>ED 301 Principles of American Ed.</td>
<td>MTHSC 301 Statistical Theory and Methods I</td>
<td>3 (3.0)</td>
<td>ED 302 Educational Psychology</td>
</tr>
<tr>
<td>MTHSC 308 College Geometry</td>
<td>MTHSC 308 Topics in Geometry</td>
<td>3 (3.0)</td>
<td>MTHSC 411 Linear Algebra</td>
</tr>
<tr>
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<td>Elective</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td></td>
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</table>

**Total Semester Hours:** 20-19

#### SENIOR YEAR

*(Block Schedule—Either Semester)*

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>ED 458 Health Education</td>
<td>MTHSC 412 Intro. to Mod. Algebra</td>
<td>3 (3.0)</td>
<td>ED 335 Adol. Growth and Dev.</td>
</tr>
<tr>
<td>MUS 210 Music Appreciation</td>
<td>MTHSC 424 Methods and Materials in Secondary School Instruction</td>
<td>3 (3.0)</td>
<td>ED 412 Directed Teaching⁴</td>
</tr>
<tr>
<td>Mathematical Sciences Elective</td>
<td>ED 498 Secondary Content</td>
<td>6</td>
<td>ED 424 Methods and Materials in Secondary School Instruction</td>
</tr>
<tr>
<td></td>
<td>Area Reading</td>
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</table>

**Total Semester Hours:** 129

¹ To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
² BIOL 103, 104, 105, 106 and a two-semester sequence in astronomy, chemistry, geology, physical science, or physics.
³ Economics, geography, philosophy, political science, psychology, religion, sociology.
⁴ This semester is a block schedule and must be taken as listed.

# Degrees and Curricula

**TEACHING AREA: MODERN LANGUAGES**
*(French, German and Spanish)*

## Freshman Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED 100 Orientation</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>HIST 172 Western Civilization</td>
</tr>
<tr>
<td>Foreign Language</td>
<td>Foreign Language</td>
</tr>
<tr>
<td>Science²</td>
<td>Science²</td>
</tr>
<tr>
<td>Elective</td>
<td>Elective</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td>16</td>
</tr>
<tr>
<td></td>
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</table>

## Sophomore Year

<table>
<thead>
<tr>
<th></th>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 173 Western Civilization</td>
<td>Foreign Language</td>
<td></td>
</tr>
<tr>
<td>Foreign Language</td>
<td>Literature Requirement¹</td>
<td></td>
</tr>
<tr>
<td>Literature Requirement¹</td>
<td>Science²</td>
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<tr>
<td>Science²</td>
<td>Social Science Elective³</td>
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<tr>
<td>Social Science Elective³</td>
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## Junior Year

<table>
<thead>
<tr>
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<th>First Semester</th>
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<tbody>
<tr>
<td>ED 301 Principles of American Ed.</td>
<td>ED 302 Educational Psychology</td>
<td></td>
</tr>
<tr>
<td>Teaching Major</td>
<td>Teaching Major</td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>Elective</td>
<td></td>
</tr>
<tr>
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</table>

## Senior Year

*(Block Schedule—Either Semester)*

<table>
<thead>
<tr>
<th></th>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAAH 303 Evol. of Vis. Arts I</td>
<td>ED 335 Adol. Growth and Dev.</td>
<td></td>
</tr>
<tr>
<td>ED 458 Health Education</td>
<td>ED 412 Directed Teaching²</td>
<td></td>
</tr>
<tr>
<td>MUS 210 Music Appreciation</td>
<td>Secondary School Instruction</td>
<td></td>
</tr>
<tr>
<td>Teaching Major</td>
<td>ED 498 Secondary Content</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Area Reading</td>
<td></td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td>128 Total Semester Hours</td>
<td></td>
</tr>
</tbody>
</table>

¹ To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
² BIOL 103, 104, 105, 106 and a two-semester sequence in astronomy, chemistry, geology, physical science, or physics.
³ Economics, geography, philosophy, political science, psychology, religion and sociology.
⁴ This semester is a block schedule and must be taken as listed.

*Note:* The teaching major requires 24 semester hours in either French, German, or Spanish as listed.

French major must include FR 205 and 21 hours arranged as follows:

- **Group I**: Fifteen Semester credits from FR 209, 301, 302, 305, 409
- **Group II**: Six semester credits from FR 403, 404, 405, 406, 407, 408, 498, 499.
- German major must include GER 205 and 21 semester hours arranged as follows:
- **Group I**: Fifteen semester hours from GER 301, 302, 305, 307, 412.
- **Group II**: Six semester hours from GER 401, 402, 403, 411, 412, 413.
- Spanish major must include SPAN 205 and 21 hours arranged as follows:
- **Group I**: Six semester credits from SPAN 303, 304, 311 (preferably in sequence).
- **Group II**: Nine semester credits from SPAN 305, 307, 308, 409.
- **Group III**: Six semester credits from SPAN 401, 402, 409, 422, 435, 440, 498, 499.
### TEACHING AREA: NATURAL SCIENCES

#### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH 101 General Chemistry ..........</td>
<td>CH 102 General Chemistry .............</td>
</tr>
<tr>
<td>ED 100 Orientation ................</td>
<td>ENGL 102 English Composition ..........</td>
</tr>
<tr>
<td>ENGL 101 English Composition ......</td>
<td>HIST 172 Western Civilization ..........</td>
</tr>
<tr>
<td>Foreign Language ...................</td>
<td>Foreign Language .......................</td>
</tr>
<tr>
<td>Elective ............................</td>
<td>Elective ...............................</td>
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<tr>
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<tr>
<td></td>
<td>Total Semester Hours: 16</td>
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<tr>
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</table>

#### SOPHOMORE YEAR

| BIOL 103 General Biology I .......... | BIOL 104 General Biology II .......... |
| BIOL 105 General Biology Lab. I ....| BIOL 106 General Biology Lab. II .....|
| HIST 173 Western Civilization ......| Foreign Language ....................|
| MTHSC 203 Elem. Stat. Inference ...| Literature Requirement^ ...........
| Foreign Language ...................| Social Science Elective^ ...........
| Literature Requirement^ ...........| Elective ............................|
| Elective ............................|                                       |
|                                    | Total Semester Hours: 17              |
|                                    |                                       |

#### JUNIOR YEAR

| ED 301 Principles of American Ed.  | ED 302 Educational Psychology ..........|
| GEOL 101 Physical Geology ..........| GEOL 102 Historical Geology ..........|
| PHYS 207 General Physics I ........| PHYS 208 General Physics II ..........|
| Science Elective^ ................| Science Elective^ ...................
| Elective ...........................| Elective ............................|
|                                    |                                       |
|                                    | Total Semester Hours: 17              |
|                                    |                                       |

#### SENIOR YEAR

(Block Schedule—Either Semester)

| ASTR 102 Stellar Astronomy ..........| ED 335 Adol. Growth and Dev. ..........|
| CAAH 303 Evol. of Vis. Arts I ......| ED 412 Directed Teaching^ ..........|
| ED 458 Health Education ............| ED 424 Methods and Materials in ....
| MUS 210 Music Appreciation ..........| Secondary School Instruction .........|
| Science Elective^ ..................| ED 498 Secondary Content ............|
|                                    | Area Reading ..........................|
|                                    |                                       |
|                                    | Total Semester Hours: 15             |

---

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

2 Science electives to be taken in biological sciences, chemistry, physics, geology.

3 Economics, geography, philosophy, political science, psychology, religion, sociology.

4 The last semester of the senior year is a block schedule and must be taken as listed.
## TEACHING AREA: POLITICAL SCIENCE

### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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</thead>
<tbody>
<tr>
<td>ED 100 Orientation</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>HIST 173 Western Civilization</td>
</tr>
<tr>
<td>HIST 172 Western Civilization</td>
<td>MTHSC 102 Intro. to Math. Anal.</td>
</tr>
<tr>
<td>MTHSC 101 Finite Probability</td>
<td>Foreign Language</td>
</tr>
<tr>
<td>Foreign Language</td>
<td>Science^2</td>
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<tr>
<td>Science^2</td>
<td>Elective</td>
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<tr>
<td>Elective</td>
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<tr>
<td>18-19</td>
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</tbody>
</table>

### SOPHOMORE YEAR

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>HIST 101 History of the U.S.</td>
<td>HIST 102 History of the U.S.</td>
</tr>
<tr>
<td>Foreign Language</td>
<td>Foreign Language</td>
</tr>
<tr>
<td>Literature Requirement^</td>
<td>Literature Requirement^</td>
</tr>
<tr>
<td>Science^2</td>
<td>Science^2</td>
</tr>
<tr>
<td>Elective</td>
<td>Elective</td>
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<tr>
<td>17-16</td>
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</tbody>
</table>

### JUNIOR YEAR

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>ED 301 Principles of American Ed.</td>
<td>ED 302 Educational Psychology</td>
</tr>
<tr>
<td>Teaching Major</td>
<td>Teaching Major</td>
</tr>
<tr>
<td>Elective</td>
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<td>15</td>
<td>15</td>
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</tbody>
</table>

### SENIOR YEAR

(Block Schedule—Either Semester)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CAAH 303 Evol. of Vis. Arts I</td>
<td>ED 335 Adol. Growth and Dev.</td>
</tr>
<tr>
<td>ED 458 Health Education</td>
<td>ED 412 Directed Teaching^</td>
</tr>
<tr>
<td>MUS 210 Music Appreciation</td>
<td>ED 424 Methods and Materials in Secondary School Instruction</td>
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<tr>
<td>Teaching Major</td>
<td>ED 498 Secondary Content</td>
</tr>
<tr>
<td></td>
<td>Area Reading</td>
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<td></td>
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<tr>
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</tr>
<tr>
<td>15</td>
<td>3 (1,4)</td>
</tr>
</tbody>
</table>

129 Total Semester Hours

---

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

2 BIOL 103, 104, 105, 106 and a two-semester sequence in astronomy, chemistry, geology, physical science, or physics.

3 This is a block schedule and must be taken as listed.

Note: The teaching major requires twenty-four semester hours of junior- and senior-level political science courses. The hours are to be drawn from four of the following fields:

- American Government—POSC 302 (required), 403, 405, 409
- Comparative Governments—POSC 371, 372, 474, 475, 476
- International Relations—POSC 361, 462, 463, 464, 465
- Political Behavior—POSC 442, 443, 454
- Political Thought—POSC 351, 352, 453, 482
- Public Administration—POSC 321, 422, 423, 424, 425, 426, 427, 428, 429
- Public Law—POSC 432, 433, 434, 435, 439
**TEACHING AREA: PSYCHOLOGY**

### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED 100 Orientation</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>HIST 173 Western Civilization</td>
</tr>
<tr>
<td>HIST 172 Western Civilization</td>
<td>MTHSC 102 Intro. to Math. Anal.</td>
</tr>
<tr>
<td>MTHSC 101 Finite Probability</td>
<td>Foreign Language</td>
</tr>
<tr>
<td>Foreign Language</td>
<td>Science</td>
</tr>
<tr>
<td>Science</td>
<td>Elective</td>
</tr>
<tr>
<td>Elective</td>
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</tr>
<tr>
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<td>18-19</td>
</tr>
</tbody>
</table>

| | |
| | 17-18 |

### SOPHOMORE YEAR

| | |
| | 17-16 |

### JUNIOR YEAR

| | |
| | 17-16 |

### SENIOR YEAR

(Block Schedule—Either Semester)

| | |
| | 15 |

| | |
| | 15 |

132 Total Semester Hours

---

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2 BIOL 103, 104, 105, 106 and a two-semester sequence in astronomy, chemistry, geology, physical science, or physics.
3 Economics, geography, philosophy, political science, psychology, religion, sociology.
4 This is a block schedule and must be taken as listed.

Note: The teaching major requires 24 semester hours of junior and senior psychology courses.

**TEACHING AREA: SOCIOLOGY**

### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED 100 Orientation</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>HIST 173 Western Civilization</td>
</tr>
<tr>
<td>HIST 172 Western Civilization</td>
<td>MTHSC 102 Intro. to Math. Anal.</td>
</tr>
<tr>
<td>MTHSC 101 Finite Probability</td>
<td>Foreign Language</td>
</tr>
<tr>
<td>Foreign Language</td>
<td>Science</td>
</tr>
<tr>
<td>Science</td>
<td>Elective</td>
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<td></td>
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<tr>
<td></td>
<td>18-19</td>
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| | |
| | 17-18 |
SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTHSC 203 Elem. Stat. Inference</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>SOC 201 Sociological Perspective</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Foreign Language</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Literature Requirement¹</td>
<td>3 (3.0)</td>
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<tr>
<td>Science²</td>
<td>4-3</td>
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<td>Elective</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>17-16</strong></td>
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JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>ED 301 Principles of American Ed.</td>
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<tr>
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<tr>
<td><strong>Total</strong></td>
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SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>CAAH 303 Evol. of Vis. Arts I</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>ED 458 Health Education</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MUS 210 Music Appreciation</td>
<td>3 (3.0)</td>
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<tr>
<td>Teaching Major</td>
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<tr>
<td>Elective²</td>
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<tr>
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17-16 Total Semester Hours

---

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

2 BIOL 103, 104, 105, 106 and a two-semester sequence in astronomy, chemistry, geology, physical science, or physics.

3 Electives must include ECON 211, 212, POSC 101.

4 This semester is a block schedule and must be taken as listed.

Note: The teaching major consists of SOC 206, 309, 311, 321, 322, 324, 331, 341, 351, 361, 381, 391, 393, 421, 431, 433, 441, 443, 451, 481, 499.

BACHELOR OF SCIENCE CURRICULA

AGRICULTURAL EDUCATION

The Agricultural Education curriculum is designed for students who wish to prepare for positions in vocational agriculture, agricultural occupations, and other teaching positions in the secondary schools; engage in other forms of educational work such as agricultural missionary, public relations and agricultural extension; farming, soil conservation and other governmental work; business and industry.

The curriculum provides for a broad education in general and professional education including student teaching. In addition to required courses giving a thorough background in the agricultural and biological sciences, a student may minor in Business, International Agriculture, or a Second Department. Students in other departments in the College of Agricultural Sciences may minor in Agricultural Education and be certified to teach if they meet all requirements.
### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGRIC 104 Intro. to Plant Science</td>
<td>AGED 100 Orient and Field Exp.</td>
</tr>
<tr>
<td>BIOL 103 General Biology I</td>
<td>AGRIC 103 Intro. to Animal Ind.</td>
</tr>
<tr>
<td>BIOL 105 General Biology Lab. II</td>
<td>BIOL 104 General Biology II</td>
</tr>
<tr>
<td>CH 101 General Chemistry</td>
<td>BIOL 106 General Biology Lab. II</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>CH 102 or 112 General Chemistry</td>
</tr>
<tr>
<td>MTHSC 102 Intro. to Math. Anal.</td>
<td>ENGL 102 English Composition</td>
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<table>
<thead>
<tr>
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<th>Elective</th>
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</thead>
<tbody>
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### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>AGEC 202 Agric. Economics</th>
<th>AGM 206 Agric. Mechanization</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGED 201 Intro. to Agric. Ed</td>
<td>AGRON 202 Soils</td>
</tr>
<tr>
<td>AGM 205 Principles of Farm Shop</td>
<td>ENGL 231 Intro to Journalism</td>
</tr>
<tr>
<td>PHYS 207 General Physics I</td>
<td>or ENGL 301 Pub. Speaking</td>
</tr>
<tr>
<td>Literature Requirement</td>
<td>or ENGL 304 Adv. Comp.</td>
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<table>
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<tr>
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<tbody>
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</table>

### JUNIOR YEAR

<table>
<thead>
<tr>
<th>AGM 301 Soil and Water Conserv.</th>
<th>AGEC 302 Econ. of Farm Mgt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENT 301 General Entomology</td>
<td>or AGEC 402 Prod. Econ</td>
</tr>
<tr>
<td>Approved Agric. Econ. Elective</td>
<td>AGRON 452 Soil Fert. and Mgt.</td>
</tr>
<tr>
<td>Approved Agriculture Elective</td>
<td>AGRON 453 Soil Fertility Lab.</td>
</tr>
<tr>
<td>Minor*</td>
<td>Minor*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Elective</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>3</td>
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</tbody>
</table>

### SENIOR YEAR

<table>
<thead>
<tr>
<th>HORT 407 Landscape Design</th>
<th>AGED 300 Supv. Field Exp. II</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLPA 401 Plant Pathology</td>
<td>AGED 401 Meth. in Agric. Ed.</td>
</tr>
<tr>
<td>Minor*</td>
<td>AGED 406 Directed Teaching</td>
</tr>
<tr>
<td>Elective</td>
<td>AGED 423 Curriculum</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td></td>
<td>ED 302 Educational Psychology</td>
</tr>
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</table>

<table>
<thead>
<tr>
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<th>Elective</th>
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</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

16 134 Total Semester Hours

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2 Students who make a satisfactory score on the Mathematics Test, Level II (Standard) may schedule other mathematics courses or electives in lieu of MTHSC 102. Students ineligible for MTHSC 102 will take MTHSC 105 as a substitute for MTHSC 102.
3 To be selected from the following: HIST 101, 102, 172, 173, PHIL 201, 325, POSC 101, PSYCH 201, RS 301, 401, SOC 201.
4 See adviser for available minors and course requirements.

### INDUSTRIAL EDUCATION

The curriculum in Industrial Education is designed to prepare students for careers in the teaching of industrial subjects and in training programs in industry. To accomplish these purposes the curriculum is divided into three areas of specialization leading to the degree of Bachelor of Science in Industrial Education. At the end of his freshman year, each student will select one of three options: Education for Industry, Industrial Arts Education, or Vocational-Technical Education. Each option requires 135 semester hours of coursework.
EDUCATION FOR INDUSTRY OPTION

The Education for Industry option is designed to prepare students to enter industry as training specialists. Due to the expansion of technology and industrial development, there is a need for training specialists and training directors in industry.

**FRESHMAN YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 101 English Composition</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>INED 101 Intro. to Ind. Ed.</td>
<td>INED 108 Training Programs in Industry I</td>
</tr>
<tr>
<td>INED 106 Drafting for Ind. Ed.</td>
<td>Science Elective²</td>
</tr>
<tr>
<td>MTHSC 104 Trigonometry</td>
<td>Technical Specialty Elective³</td>
</tr>
<tr>
<td>Technical Specialty Elective³</td>
<td>Elective</td>
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<td>Elective</td>
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**SOPHOMORE YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
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<tbody>
<tr>
<td>SOC 201 Sociological Perspective</td>
<td>ECON 211 Principles of Economics</td>
</tr>
<tr>
<td>Literature Requirement⁴</td>
<td>PSYCH 201 General Psychology</td>
</tr>
<tr>
<td>Science Elective²</td>
<td>Technical Specialty Elective³</td>
</tr>
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<td>Technical Specialty Elective³</td>
<td>Approved Elective³</td>
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**JUNIOR YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
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</thead>
<tbody>
<tr>
<td>ECON 301 Economics of Labor</td>
<td>ENGL 301 Public Speaking</td>
</tr>
<tr>
<td>IM 301 Principles of Management</td>
<td>IM 307 Personnel Management</td>
</tr>
<tr>
<td>INED 325 Ind. Org. and People</td>
<td>PSYCH 301 Industrial Psychology</td>
</tr>
<tr>
<td>TEXT 460 Textile Processes</td>
<td>Technical Specialty Elective³</td>
</tr>
<tr>
<td>Technical Specialty Elective³</td>
<td>Approved Elective³</td>
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**SENIOR YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
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<tbody>
<tr>
<td>INED 405 Course Org. and Eval.</td>
<td>INED 408 Training Programs in Industry II</td>
</tr>
<tr>
<td>INED 422 History and Philosophy</td>
<td>INED 496 Public Relations</td>
</tr>
<tr>
<td>of Industrial and Voc. Ed.</td>
<td>Approved Elective³</td>
</tr>
<tr>
<td>SOC 351 Industrial Sociology</td>
<td>Elective</td>
</tr>
<tr>
<td>Technical Specialty Elective³</td>
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</tr>
<tr>
<td>Approved Elective</td>
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<tr>
<td>Elective</td>
<td></td>
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</tr>
</tbody>
</table>

135 Total Semester Hours

¹ To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
² At least two fields must be represented with approval of adviser.
³ Approved Elective and Technical Specialty Electives to be approved by adviser.
⁴ Literature requirement includes at least one course from English, American History, or Philosophy.

**INDUSTRIAL ARTS EDUCATION OPTION**

The Industrial Arts Education option is for those students who desire to teach industrial arts in the secondary schools. Industrial arts is the subject area in the public school system which attempts to provide youth with an interpretation of American industry. It is a general education subject designed to give students exploratory experience in the classroom and laboratory. Majors in this option are qualified...
for full certification as secondary school teachers of industrial arts and prevocational education.

### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED 100 Orientation</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>INED 103 Woodworking II</td>
</tr>
<tr>
<td>INED 101 Intro. to Ind. Ed.</td>
<td>INED 105 Machining Practices</td>
</tr>
<tr>
<td>INED 102 Woodworking I</td>
<td>INED 107 Drafting for Ind. Ed. II</td>
</tr>
<tr>
<td>INED 106 Drafting for Ind. Ed. I</td>
<td>Science Elective²</td>
</tr>
<tr>
<td>MTHSC 104 Trigonometry</td>
<td>Elective</td>
</tr>
<tr>
<td>Science Elective²</td>
<td>Elective</td>
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<tr>
<td>Elective</td>
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| total | 16 |

### SOPHOMORE YEAR

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<tbody>
<tr>
<td>INED 203 Basic Metal Processes</td>
<td>INED 204 Graphic Arts</td>
</tr>
<tr>
<td>INED 205 Power Technology</td>
<td>INED 208 Electricity</td>
</tr>
<tr>
<td>Literature Requirement¹</td>
<td>INED 313 Arts and Crafts</td>
</tr>
<tr>
<td>Science Elective²</td>
<td>MUS 210 Music Appreciation</td>
</tr>
<tr>
<td>Social Science Elective³</td>
<td>Social Science Elective³</td>
</tr>
<tr>
<td>Elective</td>
<td>Elective</td>
</tr>
<tr>
<td></td>
<td>17</td>
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</table>

| total | 17 |

### JUNIOR YEAR

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>ED 302 Educational Psychology</td>
<td>ENGL 458 Health Education</td>
</tr>
<tr>
<td>INED 302 Dwelling Materials and Construction Methods</td>
<td>ENGL 301 Public Speaking</td>
</tr>
<tr>
<td>TEXT 460 Textile Processes</td>
<td>INED 317 Mgt. of Ind. Ed. Labs</td>
</tr>
<tr>
<td>Social Science Elective³</td>
<td>Social Science Elective³</td>
</tr>
<tr>
<td>Elective</td>
<td>Elective</td>
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| total | 18 |

### SENIOR YEAR

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>CAAH 303 Evol. of Vis. Arts I</td>
<td>ED 335 Adol. Growth and Dev</td>
</tr>
<tr>
<td>ED 498 Secondary Content Area Reading</td>
<td>INED 402 Directed Teaching</td>
</tr>
<tr>
<td>INED 422 Hist. and Phil. of Industrial and Vocational Ed</td>
<td>INED 405 Course Organization and Evaluation</td>
</tr>
<tr>
<td>INED 441 Comp. Lab. in Ind. Ed.</td>
<td>INED 425 Teaching Ind. Subjects</td>
</tr>
<tr>
<td>Elective¹</td>
<td>15</td>
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</tbody>
</table>

| total | 17 |

135 Total Semester Hours.

¹ To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
² Science electives to be selected from astronomy, biology, chemistry, geology, physical science, physics. At least two fields must be represented, one of which must be in the biological sciences.
³ Social Science electives to be selected from economics, geography, history, philosophy, political science, psychology, religion, sociology. At least two fields must be represented with six, but not more than six hours in one field.
⁴ See class adviser for list of approved electives.
### VOCATIONAL-TECHNICAL EDUCATION OPTION

The Vocational-Technical Education option is designed to prepare teachers of vocational and technical subjects in the senior high schools, area vocational centers, and technical education centers. All elective courses in this option will be in an area of specialization or related fields. Teachers graduating from this option will possess the skills and knowledge required to teach the occupation or family of occupations in their area of specialization.

#### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED 100 Orientation ........................................ 1 (1,0)</td>
<td>ENGL 102 English Composition .................................. 3 (3,0)</td>
</tr>
<tr>
<td>ENGL 101 English Composition .................................. 3 (3,0)</td>
<td>INED 105 Machining Practices .................................. 3 (1,6)</td>
</tr>
<tr>
<td>INED 101 Intro. to Ind. Ed. ..................................... 1 (1,0)</td>
<td>INED 107 Drafting Ind. Ed. II .................................. 2 (0,6)</td>
</tr>
<tr>
<td>INED 102 Woodworking I ......................................... 2 (1,3)</td>
<td>Science Elective(^2) ........................................... 4</td>
</tr>
<tr>
<td>INED 106 Drafting Ind. Ed. I .................................... 2 (0,6)</td>
<td>Social Science Elective(^3) .................................. 3</td>
</tr>
<tr>
<td>MTHSC 104 Trigonometry ......................................... 2 (2,0)</td>
<td>Elective ......................................................... 1</td>
</tr>
<tr>
<td>Science Elective(^2) ........................................... 4</td>
<td><strong>16</strong></td>
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<tr>
<td>Elective ......................................................... 1</td>
<td><strong>16</strong></td>
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<tr>
<td><strong>16</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

#### SOPHOMORE YEAR

| INED 203 Basic Metal Processes .................................. 3 (1,6) | ENGL 301 Public Speaking ........................................ 3 (3,0) |
| INED 205 Power Technology ........................................ 3 (2,2) | INED 204 Graphic Arts ........................................... 3 (1,6) |
| Literature Requirement\(^1\) ...................................... 3 (3,0) | INED 208 Electricity ............................................. 3 (2,3) |
| Science Elective\(^2\) ........................................... 4 | MUS 210 Music Appreciation .................................... 3 (3,0) |
| Social Science Elective\(^3\) .................................... 3 | Elective ......................................................... 2 |
| Elective ......................................................... 1 | **14** |
| **17** | **17** |

#### SUMMER

| INED 350 Industrial Cooperative Experience ...................... 6 (0,18) | |

#### JUNIOR YEAR

| ED 302 Educational Psychology .................................... 3 (3,0) | ED 458 Health Education .......................................... 3 (3,0) |
| INED 302 Dwelling Materials and Construction Method ............... 2 (1,2) | INED 317 Mgt. of Ind. Ed. Labs .................................. 3 (2,2) |
| Social Science Elective\(^3\) ..................................... 3 | Social Science Elective\(^3\) ..................................... 3 |
| Elective (Area of Spec.) ........................................... 3 | Elective (Area of Spec.) ........................................... 3 |
| Elective ......................................................... 4 | **15** |
| **15** | **15** |

#### SUMMER

| INED 450 Industrial Cooperative Experience ...................... 6 (0,18) | |

#### SENIOR YEAR

| CAAH 303 Evol. of Vis. Arts I ..................................... 3 (3,0) | Ed 335 Adol. Growth and Dev. .................................. 3 (3,0) |
| ED 498 Secondary Content Area Reading ............................ 3 (1,4) | INED 402 Directed Teaching ..................................... 6 (0,18) |
| INED 422 Hist. and Phil. of Industrial and Vocational Ed. ......... 3 (3,0) | INED 405 Course Organization and Evaluation .................... 3 (3,0) |
| INED 441 Comp. Lab. in Ind. Ed. .................................... 3 (1,4) | INED 425 Teaching Ind. Subjects .................................. 3 (3,0) |
| Elective (Area of Spec.) ........................................... 3 | **15** |
| **15** | **15** |

135 Total Semester Hours

---

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2 To be selected from the following: astronomy, biology, chemistry, geology, physical science, or physics. At least two fields must be represented, one of which must be in the biological sciences.
3 To be selected from the following: economics, geography, history, philosophy, political science, psychology, religion, sociology. At least two fields must be represented with six, but not more than six, hours in one field.
4 See adviser for electives.
SCIENCE TEACHING

The program leading to a Bachelor of Science degree in Science Teaching is designed for students planning to teach biological sciences, chemistry, earth science, mathematical sciences, or physical sciences on the secondary school level. The required science electives are included to give some degree of competency in a field other than the major area.

A student must have a minimum of 130 semester hours of credit for graduation.

TEACHING AREA: BIOLOGICAL SCIENCES

<table>
<thead>
<tr>
<th>FRESHMAN YEAR</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Semester</td>
<td>Second Semester</td>
</tr>
<tr>
<td>BIOL 103 General Biology I .................. 3 (3.0)</td>
<td>BIOL 104 General Biology II .................. 3 (3.0)</td>
</tr>
<tr>
<td>BIOL 105 General Biology Lab. I ...... 1 (0.3)</td>
<td>BIOL 106 General Biology Lab. II .... 1 (0.3)</td>
</tr>
<tr>
<td>CH 101 General Chemistry .................. 4 (3.3)</td>
<td>CH 112 General Chemistry .................. 4 (3.3)</td>
</tr>
<tr>
<td>ED 100 Orientation ......................... 1 (1.0)</td>
<td>ENGL 102 English Composition ............ 3 (3.0)</td>
</tr>
<tr>
<td>ENGL 101 English Composition ............. 3 (3.0)</td>
<td>MTHSC 106 Calc. of One Var. I ............. 4 (4.0)</td>
</tr>
<tr>
<td>MTHSC 105 Algebra and Trig. ............... 5 (5.0)</td>
<td>Elective ........................................ 1</td>
</tr>
<tr>
<td>Elective ........................................ 1</td>
<td>Total Semester Hours ....................... 18</td>
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<table>
<thead>
<tr>
<th>SOPHOMORE YEAR</th>
<th>SOPHOMORE YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 172 Western Civilization ................ 3 (3.0)</td>
<td>HIST 173 Western Civilization ................ 3 (3.0)</td>
</tr>
<tr>
<td>PHYS 207 General Physics I .................. 4 (3.2)</td>
<td>PHYS 208 General Physics II .................. 4 (3.2)</td>
</tr>
<tr>
<td>Literature Requirement¹ ..................... 3 (3.0)</td>
<td>Literature Requirement¹ ..................... 3 (3.0)</td>
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<tr>
<td>Chemistry Elective .......................... 4</td>
<td>Chemistry Elective .......................... 4</td>
</tr>
<tr>
<td>Elective ........................................ 3</td>
<td>Social Science Elective³ ..................... 3</td>
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<tr>
<td>Total Semester Hours ....................... 17</td>
<td>Elective ........................................ 1</td>
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<thead>
<tr>
<th>JUNIOR YEAR</th>
<th>JUNIOR YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOT 202 Survey of Plant Kingdom ............. 4 (3.3)</td>
<td>ED 302 Educational Psychology ................ 3 (3.0)</td>
</tr>
<tr>
<td>ED 301 Principles of American Ed. ........... 3 (3.0)</td>
<td>GEN 302 Genetics ................................ 4 (3.3)</td>
</tr>
<tr>
<td>ZOOL 202 Vertebrate Zoology .................. 4 (3.3)</td>
<td>MICRO 305 General Microbiology ................ 4 (3.3)</td>
</tr>
<tr>
<td>Science Elective ............................ 3</td>
<td>MUS 210 Music Appreciation .................... 3 (3.0)</td>
</tr>
<tr>
<td>Social Science Elective³ ..................... 3</td>
<td>Elective .......................................... 3</td>
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<tr>
<td>Total Semester Hours ....................... 17</td>
<td>Total Semester Hours ....................... 17</td>
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<tr>
<th>SENIOR YEAR</th>
<th>SENIOR YEAR</th>
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<tbody>
<tr>
<td>BOT 421 Plant Physiology ..................... 4 (3.3)</td>
<td>ED 335 Adol. Growth and Dev. ............... 3 (3.0)</td>
</tr>
<tr>
<td>or ZOOL 459 Syst. Physiology ................ 4 (3.3)</td>
<td>ED 412 Directed Teaching¹ ................... 6 (1.15)</td>
</tr>
<tr>
<td>CAAH 303 Evol. of Vis. Arts I ............... 3 (3.0)</td>
<td>ED 424 Methods and Materials in ...............</td>
</tr>
<tr>
<td>ED 458 Health Education ..................... 3 (3.0)</td>
<td>Secondary School Instruction ................. 3 (3.0)</td>
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<td>Major Elective² ................................ 5</td>
<td>ED 498 Secondary Content Area .................</td>
</tr>
<tr>
<td>Reading ......................................... 3 (1.4)</td>
<td>Total Semester Hours ....................... 133</td>
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1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2 Botany, genetics, microbiology, zoology.
3 Economics, geography, philosophy, political science, psychology, religion, sociology.
4 Block schedule must be taken as shown.
### TEACHING AREA: CHEMISTRY

#### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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</thead>
<tbody>
<tr>
<td>BIOL 103 General Biology I</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>BIOL 105 General Biology Lab. I</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>CH 101 General Chemistry</td>
<td>4 (3.3)</td>
</tr>
<tr>
<td>ED 100 Orientation</td>
<td>1 (1.0)</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>3 (3.0)</td>
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<tr>
<td>MTHSC 106 Cal. of One Var. I</td>
<td>4 (4.0)</td>
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<td>Elective</td>
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<td><strong>Total</strong></td>
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#### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
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<tbody>
<tr>
<td>CH 223 Organic Chemistry</td>
<td>3 (3.0)</td>
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<tr>
<td>CH 227 Organic Chemistry Lab.</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>HIST 172 Western Civilization</td>
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<tr>
<td>MTHSC 206 Calculus of Sev. Var.</td>
<td>4 (4.0)</td>
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<tr>
<td>Literature Requirement</td>
<td>3 (3.0)</td>
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#### JUNIOR YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
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</tr>
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<tbody>
<tr>
<td>CH 313 Quantitative Analysis</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>ED 301 Principles of American Ed.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>PHYS 207 General Physics I</td>
<td>4 (3.2)</td>
</tr>
<tr>
<td>Social Science Elective</td>
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</tr>
<tr>
<td>Elective</td>
<td>5</td>
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<tr>
<td><strong>Total</strong></td>
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#### SENIOR YEAR

*(Block Schedule—Either Semester)*

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAAH 303 Evol. of Vis. Arts I</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>CH 332 Physical Chemistry</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>CH 340 Physical Chem. Lab</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>CH 402 Inorganic Chemistry</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>ED 458 Health Education</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MUS 210 Music Appreciation</td>
<td>3 (3.0)</td>
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<tr>
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<tr>
<td><strong>Total</strong></td>
<td>16</td>
</tr>
<tr>
<td><strong>130 Total Semester Hours</strong></td>
<td></td>
</tr>
</tbody>
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1. To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2. Economics, geography, philosophy, political science, psychology, religion, sociology.
3. Block Schedule must be taken as shown.

### TEACHING AREA: EARTH SCIENCE

#### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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</thead>
<tbody>
<tr>
<td>BIOL 103 General Biology I</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>BIOL 105 General Biology Lab. I</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>CH 101 General Chemistry</td>
<td>4 (3.3)</td>
</tr>
<tr>
<td>ED 100 Orientation</td>
<td>1 (1.0)</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>3 (3.0)</td>
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<tr>
<td>MTHSC 101 Finite Probability</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Elective</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>16</td>
</tr>
</tbody>
</table>
### TEACHING AREA: MATHEMATICAL SCIENCES

#### FRESHMAN YEAR

**First Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 103 General Biology I</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>BIOL 105 General Biology Lab. I</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>CH 101 General Chemistry</td>
<td>4 (3.3)</td>
</tr>
<tr>
<td>ED 100 Orientation</td>
<td></td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 106 Cal. of One Var. I</td>
<td>4 (4.0)</td>
</tr>
<tr>
<td>Elective</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

**Second Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 172 Western Civilization</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 206 Calculus of Var.</td>
<td>4 (4.0)</td>
</tr>
<tr>
<td>PHYS 207 General Physics I</td>
<td>4 (3.2)</td>
</tr>
<tr>
<td>Literature Requirement¹</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Elective</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOL 101 Physical Geology</td>
<td>4 (3.2)</td>
</tr>
<tr>
<td>HIST 172 Western Civilization</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>PHYS 207 General Physics I</td>
<td>4 (3.2)</td>
</tr>
<tr>
<td>Literature Requirement¹</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Social Science Elective¹</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOL 102 Historical Geology</td>
<td>4 (3.3)</td>
</tr>
<tr>
<td>HIST 173 Western Civilization</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>PHYS 208 General Physics II</td>
<td>4 (3.2)</td>
</tr>
<tr>
<td>Literature Requirement¹</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Elective</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
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</tr>
</tbody>
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### JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTR 101 Solar Sys. Astr.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>or ASTR 102 Stellar Astr.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>ED 301 Principles of American Ed.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>GEOL 306 Mineralogy</td>
<td>3 (2.3)</td>
</tr>
<tr>
<td>MTHSC 203 Elem. Stat. Inference</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Elective</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED 302 Educational Psychology</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>GEOL 405 Geomorphology</td>
<td>4 (3.3)</td>
</tr>
<tr>
<td>PHYS 240 Physics of the Weather</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Science Elective</td>
<td>3</td>
</tr>
<tr>
<td>Social Science Elective³</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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</tbody>
</table>

### SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAAH 303 Evol. of Vis. Arts I</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>ED 458 Health Education</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Science Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED 335 Adol. Growth and Dev.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>ED 412 Directed Teaching²</td>
<td>6 (1,15)</td>
</tr>
<tr>
<td>Secondary School Instruction</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>ED 498 Secondary Content Area Reading</td>
<td>3 (1,4)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

130 Total Semester Hours

---

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

2 Prerequisite: Satisfactory score on the Mathematics Test, Level II or permission of instructor.

3 Economics, geography, philosophy, political science, psychology, religion, sociology.

4 Block schedule must be taken as shown.
### SENIOR YEAR

(Block Schedule—Either Semester)

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAAH 303 Evol. of Vis. Arts I</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>ED 458 Health Education</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 412 Intro. to Modern Algebra</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MUS 210 Music Appreciation</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Mathematical Sciences Elective1</td>
<td>6</td>
</tr>
<tr>
<td>ED 335 Adol. Growth and Dev.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>ED 412 Directed Teaching2</td>
<td>6 (1.15)</td>
</tr>
<tr>
<td>ED 424 Methods and Materials in</td>
<td></td>
</tr>
<tr>
<td>Secondary School Instruction</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Reading</td>
<td>3 (1.4)</td>
</tr>
</tbody>
</table>

18

131 Total Semester Hours

---

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2 Suggested electives: CPSC 110, MTHSC 405, 409, 452, 453, 454.
3 Economics, geography, philosophy, political science, psychology, religion, sociology.
4 Block schedule must be taken as shown.

### TEACHING AREA: PHYSICAL SCIENCES

#### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 103 General Biology I</td>
<td>BIOL 104 General Biology II</td>
</tr>
<tr>
<td>BIOL 105 General Biology Lab. I</td>
<td>BIOL 106 General Biology Lab. II</td>
</tr>
<tr>
<td>CH 101 General Chemistry</td>
<td>CH 102 or 112 General Chemistry</td>
</tr>
<tr>
<td>ED 100 Orientation</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>MTHSC 106 Cal. of One Var. I</td>
</tr>
<tr>
<td>MTHSC 105 Algebra and Trig</td>
<td>Elective</td>
</tr>
<tr>
<td>Elective</td>
<td>3 (3.0)</td>
</tr>
</tbody>
</table>

18

#### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 172 Western Civilization</td>
<td>CH 201 General Chemistry</td>
</tr>
<tr>
<td>PHYS 207 General Physics I</td>
<td>HIST 173 Western Civilization</td>
</tr>
<tr>
<td>Literature Requirement1</td>
<td>PHYS 208 General Physics II</td>
</tr>
<tr>
<td>Science Elective</td>
<td>Literature Requirement1</td>
</tr>
<tr>
<td>Elective</td>
<td>Elective</td>
</tr>
</tbody>
</table>

17

#### JUNIOR YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTR 101 Solar System Astronomy</td>
<td>ASTR 102 Stellar Astronomy</td>
</tr>
<tr>
<td>ED 301 Principles of American Ed.</td>
<td>ED 302 Educational Psychology</td>
</tr>
<tr>
<td>GEOL 101 Physical Geology</td>
<td>GEOL 102 Historical Geology</td>
</tr>
<tr>
<td>Social Science Elective2</td>
<td>PHYS 460 Contemporary Physics for High School Teachers</td>
</tr>
<tr>
<td>Elective</td>
<td>Social Science Elective2</td>
</tr>
</tbody>
</table>

16

### SENIOR YEAR

(Block Schedule—Either Semester)

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAAH 303 Evol. of Vis. Arts I</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>ED 458 Health Education</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MUS 210 Music Appreciation</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Science Elective</td>
<td>6</td>
</tr>
<tr>
<td>Science Elective</td>
<td>6</td>
</tr>
<tr>
<td>ED 335 Adol. Growth and Dev.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>ED 412 Directed Teaching2</td>
<td>6 (1.15)</td>
</tr>
<tr>
<td>ED 424 Methods and Materials in</td>
<td></td>
</tr>
<tr>
<td>Secondary School Instruction</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Reading</td>
<td>3 (1.4)</td>
</tr>
</tbody>
</table>

15

130 Total Semester Hours

---

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2 Economics, geography, philosophy, political science, psychology, religion, sociology.
3 Block schedule must be taken as shown in either semester of the senior year.
COLLEGE OF ENGINEERING

The College of Engineering offers professional curricular programs and programs in both Engineering Analysis and Engineering Technology. Each of the programs offered leads to a wide range of career opportunities and serves as preparation for further study at the graduate level.

Professional Curricula Six, four-year professional-oriented curricula are offered by the College of Engineering; namely, Agricultural Engineering, Ceramic Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering, and Mechanical Engineering. Each of these professional curricula is accredited by the Accreditation Board for Engineering and Technology, the recognized national accrediting agency for professional curricula in engineering. The curriculum in Agricultural Engineering is jointly administered by the College of Agricultural Sciences and the College of Engineering.

Although the College of Engineering does not offer specific options or majors in each of these professional curricula, the instruction includes many phases of each respective field. Thus, a civil engineering student is graduated in civil engineering rather than structural engineering, highway engineering, sanitary engineering, or other such options. However, a student who wishes to study within the areas encompassed by these options will find adequate courses within the Civil Engineering curriculum to prepare himself for work in any of these areas. In the same way the other engineering curricula include thorough education in various phases of the field of specialization without overemphasizing one phase to the neglect of others. The professional curricula lead to a Bachelor of Science degree in the specific professional area.

The courses required in all professional curricula and the Engineering Analysis curriculum for the freshman year are as follows:

FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH 101 General Chemistry ……… 4 (3.3)</td>
<td>ENGL 102 English Composition ……… 3 (3.0)</td>
</tr>
<tr>
<td>ENGL 101 English Composition ……… 3 (3.0)</td>
<td>Humanistic–Social Elective ……… 3</td>
</tr>
<tr>
<td>ENGR 180 Engineering Concepts ……… 3 (2.2)</td>
<td>or ENGR 180 Engr. Concepts ……… 3 (2.2)</td>
</tr>
<tr>
<td>or Humanistic–Social Elective ……… 3</td>
<td>MTHSC 108 Cal. of One Var. II ……… 4 (4.0)</td>
</tr>
<tr>
<td>MTHSC 106 Cal. of One Var. I ……… 4 (4.0)</td>
<td>PHYS 122 Phys. with Cal. I ……… 3 (2.2)</td>
</tr>
<tr>
<td>Elective ……… 2</td>
<td>Basic Science¹ ……… 3-4</td>
</tr>
<tr>
<td>16</td>
<td>Elective ……… 1</td>
</tr>
<tr>
<td>17-18</td>
<td></td>
</tr>
</tbody>
</table>

¹ Agricultural Engineering students should consult adviser. Ceramic Engineering students may take either CH 102 or 112. Chemical Engineering students are required to take CH 112. Mechanical Engineering students are required to take CH 102. Electrical Engineering students are required to take 4 credits of Basic Science.

Engineering Analysis Curriculum: This curriculum is a four-year engineering science-oriented course of study. Its objectives are two-fold. These are (1) to prepare a student for employment in areas of engineering activity requiring a high level of analytical competency,
and (2) to provide a flexible undergraduate preparation for the study of engineering at the graduate level.

The curriculum leads to the Bachelor of Science degree in Engineering Analysis. Requirements for this degree are stated in terms of subject matter area rather than in terms of specific courses. Degree requirements are as follows:

<table>
<thead>
<tr>
<th>Area of Concentration</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Science (including 8 hours of physics)</td>
<td>16</td>
</tr>
<tr>
<td>Engineering Science (distributed in at least six engineering science areas)</td>
<td>32</td>
</tr>
<tr>
<td>Humanistic–Social Studies</td>
<td>32</td>
</tr>
<tr>
<td>Mathematical Sciences (including 12 hours of post-calculus mathematical sciences)</td>
<td>24</td>
</tr>
<tr>
<td>Electives</td>
<td>22</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>138</strong></td>
</tr>
</tbody>
</table>

The educational objectives of the program will be met by the selection of an area of concentration which will be chosen from several specialty areas offered within the professional engineering curricula. The selection of specific courses, particularly in the junior and senior years, will then depend primarily on the choice of the area of concentration. By judicious selection of courses within this flexible structure, a student may prepare himself for entry into the professional schools of law and medicine.

Maximum flexibility within this program is achieved by permitting a student to defer his choice of specialization until the junior year or later. Such deferral will then allow students from junior and senior colleges not offering engineering to transfer into the program with little or no loss in academic credit.

**Engineering Technology Curriculum**

This curriculum is a four-year, applications-and-job oriented plan of study which leads to a Bachelor of Science degree in Engineering Technology. Engineering Technology is accredited by the Technology Accreditation Commission of Accreditation Board for Engineering and Technology. It provides a broad base of fundamentals and their application in the areas of civil, electrical, mechanical, and industrial engineering technology. In addition, electives amounting to approximately two semesters of work permit developing a program to match the student’s aptitudes and interests as related to industrial and other employment opportunities. These opportunities are found in such areas as plant engineering, electrical and mechanical equipment development, production supervision, industrial planning, production methods, technical purchasing and sales, building construction, quality control, technical personnel management, specification, operation and supervision of plant environmental and energy systems, equipment maintenance, and technical writing and drawing.

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1 Additional information on both the Engineering Analysis and the Engineering Technology programs is available from the Office of the Dean of Engineering.
The engineering technologist is typically a practical person interested in applying engineering principles and in organizing people for industrial production, construction or operation; or in the improvement of devices, processes, methods or procedures, as contrasted to the engineer whose more indepth, theoretical training qualifies him more for doing original system design. Requirements for the Bachelor of Science degree in Engineering Technology are as follows:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Hours</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Science and Mathematical Sciences (including statistics, computer programming, and an elective)</td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>Technical Core</td>
<td></td>
<td>35</td>
</tr>
<tr>
<td>Technical Specialty</td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>Communications, Humanities, and Social Sciences (including electives)</td>
<td></td>
<td>24</td>
</tr>
<tr>
<td>Approved Electives</td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>130</strong></td>
</tr>
</tbody>
</table>

The Engineering Technology program is designed to educate both regular four-year students and transfer students from community colleges and technical education colleges.

**AGRICULTURAL ENGINEERING**

The graduate in Agricultural Engineering with broad training in mathematics, physics, chemistry, and the biological sciences as well as comprehensive coverage of the engineering sciences is well equipped to apply engineering to many functions affecting the well-being of mankind. The agricultural engineer is sought by industry and public service organizations primarily for his ability to apply engineering know-how to agricultural production and processing and to the management of land and water resources. Specific areas of interest include power and machinery, soil and water resources engineering, electric power and processing, structures and environment, and food engineering.

The curriculum includes such engineering sciences as mechanics, fluids, thermodynamics, electrical theory, computing devices, and systems analyses. The basic agricultural sciences of soil, plants, and animals are included to provide a foundation for agricultural engineering analysis and design. Also included are the important facets of energy conversion, engineering properties of biological materials, research methods, and use of economy and integrity in design.

Graduate programs lead to the Master of Science, Master of Engineering, and the Doctor of Philosophy degrees.

Opportunities for employment of agricultural engineering graduates include design engineers, research engineers, production engineers, or as sales engineers with industry; as teachers, research, extension, or field engineers with state and federal agencies; engineers in the private sectors; and others.
See page 99 for Freshman year.

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE 221 Soil and Water Resources</td>
<td>AGE 212 Fund. of Mechanization</td>
</tr>
<tr>
<td>Engineering I</td>
<td>EM 202 Engr. Mech. (Dynamics)</td>
</tr>
<tr>
<td>2 (1.3)</td>
<td>PHYS 222 Phys. with Cal. Ill</td>
</tr>
<tr>
<td>EM 201 Engr. Mech. (Statics)</td>
<td>Plant Science Elective</td>
</tr>
<tr>
<td>3 (3.0)</td>
<td>Elective</td>
</tr>
<tr>
<td>MTHSC 206 Calculus of Sev. Var</td>
<td></td>
</tr>
<tr>
<td>4 (4.0)</td>
<td></td>
</tr>
<tr>
<td>PHYS 221 Phys. with Cal. II</td>
<td></td>
</tr>
<tr>
<td>3 (2.2)</td>
<td></td>
</tr>
<tr>
<td>Literature Requirement</td>
<td></td>
</tr>
<tr>
<td>3 (3.0)</td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>19</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JUNIOR YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE 353 Computational Systems</td>
</tr>
<tr>
<td>2 (1.3)</td>
</tr>
<tr>
<td>2 (1.3)</td>
</tr>
<tr>
<td>E&amp;CE 307 Basic Elec. Engr</td>
</tr>
<tr>
<td>2 (2.0)</td>
</tr>
<tr>
<td>E&amp;CE 309 Elec. Engr. Lab. I</td>
</tr>
<tr>
<td>1 (0.2)</td>
</tr>
<tr>
<td>EM 304 Mechanics of Materials</td>
</tr>
<tr>
<td>3 (3.0)</td>
</tr>
<tr>
<td>ME 311 Engr. Thermo. I</td>
</tr>
<tr>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Animal-Science Elective</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SENIOR YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE 431 Agric. Structures Design</td>
</tr>
<tr>
<td>3 (2.3)</td>
</tr>
<tr>
<td>AGE 471 Research I</td>
</tr>
<tr>
<td>1 (0.3)</td>
</tr>
<tr>
<td>ECON 211 Prin. of Economics</td>
</tr>
<tr>
<td>3 (3.0)</td>
</tr>
<tr>
<td>or ECON 200 Econ. Concepts</td>
</tr>
<tr>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Engineering Science Elective</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>Mathematical Sciences Elective</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td><strong>16</strong></td>
</tr>
<tr>
<td><strong>18</strong></td>
</tr>
<tr>
<td><strong>138 Total Semester Hours</strong></td>
</tr>
</tbody>
</table>

---

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2 Electives to be selected in consultation with advisor.

*Note:* Agricultural Engineering curriculum is jointly administered by the College of Engineering and the College of Agricultural Sciences.

**CERAMIC ENGINEERING**

Window glass, implantable teeth, brick, ceramic bones, nuclear fuel, radomes, solid-state electronic devices, and bathroom fixtures are illustrations of the variety of products of the multibillion-dollar ceramic industry. Ceramic engineers are engineers to this industry, providing professional service in research, design, technical sale, production, and management.

The curriculum is an engineering curriculum with 75 percent of the course time devoted to coursework common to all engineers and 25 percent to specialization in the field of ceramics. The core courses are in mathematics, basic science, engineering science, humanities, and social sciences. The specialized courses are in nonmetallic minerals, high-temperature chemistry, thermal processing, and material characterization.

The curriculum leads to the degree of Bachelor of Science in Ceramic Engineering. Graduate courses are offered leading to advanced degrees.
See page 99 for Freshman year.

### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRE 201 Intro. to Ceramic Engr.</td>
<td>CRE 202 Ceramic Materials</td>
</tr>
<tr>
<td>CRE 204 Laboratory Procedures</td>
<td>MTHSC 208 Engineering Math I</td>
</tr>
<tr>
<td>MTHSC 206 Calculus of Sev. Var.</td>
<td>PHYS 222 Phys. with Cal. III</td>
</tr>
<tr>
<td>PHYS 221 Phys. with Cal. II</td>
<td>Literature Requirement¹</td>
</tr>
<tr>
<td>Literature Requirement¹</td>
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</tr>
<tr>
<td>Planned Elective</td>
<td>Elective</td>
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<td>Elective</td>
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### JUNIOR YEAR

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<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>CH 331 Physical Chemistry</td>
<td>CRE 302 Thermo-Chemical Cer.</td>
</tr>
<tr>
<td>CRE 304 Experiment Design</td>
<td>CRE 309 Research Methods</td>
</tr>
<tr>
<td>CRE 307 Thermal Process of Cer.</td>
<td>E&amp;CE 308 Electronics and</td>
</tr>
<tr>
<td>E&amp;CE 307 Basic Elec. Engr.</td>
<td>Electromechanics</td>
</tr>
<tr>
<td>EM 201 Engr. Mech. (Statics)</td>
<td>Planned Elective</td>
</tr>
<tr>
<td>Planned Elective</td>
<td>Elective</td>
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### SENIOR YEAR

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>CRE 402 Solid State Ceramics</td>
<td>CRE 403 Glasses</td>
</tr>
<tr>
<td>EM 304 Mechanics of Materials</td>
<td>ME 304 Heat Transfer</td>
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<tr>
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<tr>
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<td><strong>17</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

1 Total Semester Hours

Note: Nine credits of planned electives must be taken in humanistic-social science courses. Nineteen credits of planned electives should be technical courses selected with the help of class adviser.

### CHEMICAL ENGINEERING

The Chemical Engineering curriculum is unique in that it is based on the three sciences of chemistry, physics, and mathematics. As a result, the traditional chemical-process industries which produce the industrial chemicals upon which our modern society is based require large numbers of chemical engineers. In addition, graduates are avidly sought by industries in many areas of specialized technology such as nuclear power, fibers and textiles, pharmaceuticals, pulp and paper, computers, foods, metals, ceramics, instrumentation and automatic control, and petroleum. The chemical engineer is in the forefront of the fight against environmental pollution and is leading the way in applying engineering technology to the solution of medical and health-related problems.

The chemical engineering graduate, because of his broad background in three sciences is uniquely prepared for a wide variety of careers in which he can apply his abilities and education. By the judicious use of electives and course selection, and with the advice and consent of his adviser, a chemical engineering student may enhance his basic education by the selection of an option designed
to further a specific career objective. Such options might be used to prepare him to enter other professional schools, such as medicine, dentistry, or law.

See page 99 for Freshman year.

**SOPHOMORE YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH 223 Organic Chemistry</td>
<td>CH 224 Organic Chemistry</td>
</tr>
<tr>
<td>CH 201 Intro. to Chem. Engr.</td>
<td>CH 229 Organic Chemistry Lab</td>
</tr>
<tr>
<td>EG 109 Engr. Graphics</td>
<td>CHE 210 Process Modeling and</td>
</tr>
<tr>
<td>MTHSC 206 Calculus of Sev. Var.</td>
<td>Numerical Methods</td>
</tr>
<tr>
<td>PHYS 221 Phys. with Cal. II</td>
<td>EM 201 Engr. Mech. (Statics)</td>
</tr>
<tr>
<td>Literature Requirement*</td>
<td>MTHSC 208 Engineering Math. I</td>
</tr>
<tr>
<td>Elective</td>
<td>Literature Requirement*</td>
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**JUNIOR YEAR**

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<table>
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<tr>
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<tbody>
<tr>
<td>CH 331 Physical Chemistry</td>
<td>CH 332 Physical Chemistry</td>
</tr>
<tr>
<td>CH 339 Physical Chemistry Lab</td>
<td>CH 340 Physical Chemistry Lab</td>
</tr>
<tr>
<td>EM 304 Mech. of Materials</td>
<td>CHE 353 Process Dynamics</td>
</tr>
<tr>
<td>MTHSC 309 Engineering Math. II</td>
<td>Humanistic-Social Elective</td>
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<td>Elective</td>
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**SENIOR YEAR**

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<tbody>
<tr>
<td>CHE 407 Unit. Op. Lab. II</td>
<td>CHE 422 Process Dev., Design and</td>
</tr>
<tr>
<td>CHE 421 Process Dev., Design and</td>
<td>Optimiza. of Chem. Engr. Sys. II</td>
</tr>
<tr>
<td>CHE 430 Chem. Engr. Thermo. II</td>
<td>PHYS 222 Phys. with Cal. III</td>
</tr>
<tr>
<td>CHE 440 Senior Inspection Trip</td>
<td>Humanistic-Social Elective</td>
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<tr>
<td>CHE 450 Chem. Engr. Kinetics</td>
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<td>Humanistic-Social Elective</td>
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</tbody>
</table>

144 Total Semester Hours

* To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
CIVIL ENGINEERING

Civil engineering involves the planning, design, construction, maintenance, and use of facilities and systems to control and improve the environment for modern civilization. Civil engineering is the broadest of the engineering professions, being the stem from which most other branches of engineering have developed.

The program in Civil Engineering leads to the Bachelor of Science degree and is designed to equip the graduate with a knowledge of basic science, engineering science, and engineering design. The civil engineering graduate is prepared to work immediately upon graduation in practically any of the areas of the profession. These include traffic and transportation engineering, structural engineering, construction, soils and foundation engineering, ocean and coastal engineering, airphoto interpretation, hydrology, public works engineering, and others. The engineering student is also educated in the humanities, social sciences, and in economic issues. A concerned society demands economy as well as realistic consideration of the resulting human benefits of the engineer's endeavors.

Graduates are encouraged to become registered engineers and to continue their education throughout their professional careers. Many students find that programs in Civil Engineering provide excellent preparation for careers in technical sales and management.

See page 99 for Freshman year.

SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Description</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>CE 201</td>
<td>Surveying</td>
<td>3 (2.3)</td>
</tr>
<tr>
<td>EM 201</td>
<td>Engr. Mech. (Statics)</td>
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</tr>
<tr>
<td>MTHSC 206</td>
<td>Calculus of Sev. Var.</td>
<td>4 (4.0)</td>
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<tr>
<td>PHYS 221</td>
<td>Phys. with Cal. II</td>
<td>3 (2.2)</td>
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<td>Literature Requirement†</td>
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<tr>
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<tr>
<td>EG 110</td>
<td>Engr. Design Graphics</td>
<td>2 (1.3)</td>
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<td>EM 304</td>
<td>Mechanics of Materials</td>
<td>3 (3.0)</td>
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<td>EM 305</td>
<td>Mech. of Materials Lab.</td>
<td>1 (0.3)</td>
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<tr>
<td>MTHSC 208</td>
<td>Engineering Math. I</td>
<td>4 (4.0)</td>
</tr>
<tr>
<td>PHYS 222</td>
<td>Phys. with Gal. III</td>
<td>3 (2.2)</td>
</tr>
<tr>
<td>Literature Requirement†</td>
<td>3 (3.0)</td>
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<tr>
<td>Elective</td>
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JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Description</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CE 205</td>
<td>Civil Engr. Comp. Ap.</td>
<td>3 (2.2)</td>
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<tr>
<td>CE 301</td>
<td>Structural Analysis I</td>
<td>3 (2.2)</td>
</tr>
<tr>
<td>CE 320</td>
<td>Intro. to Cons. Materials</td>
<td>3 (2.3)</td>
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<tr>
<td>CRE 310</td>
<td>Intro. to Material Sci.</td>
<td>3 (3.0)</td>
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<tr>
<td>EM 202</td>
<td>Engr. Mech. (Dynamics)</td>
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<tr>
<td>ENGL 314</td>
<td>Technical Writing</td>
<td>3 (3.0)</td>
</tr>
<tr>
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<tr>
<td>CE 302</td>
<td>Structural Steel Design</td>
<td>3 (2.2)</td>
</tr>
<tr>
<td>CE 310</td>
<td>Transportation Engr.</td>
<td>4 (3.2)</td>
</tr>
<tr>
<td>ECON 200</td>
<td>Economic Concepts</td>
<td>3 (3.0)</td>
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<tr>
<td>EM 320</td>
<td>Fluid Mechanics</td>
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<td>Fluid Mechanics Lab.</td>
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SENIOR YEAR

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CE 330</td>
<td>Soil Mechanics</td>
<td>3 (2,2)</td>
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<tr>
<td>CE 421</td>
<td>Hydrology</td>
<td>3 (3,0)</td>
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<tr>
<td>CE 424</td>
<td>Intro. to Const. Engr.</td>
<td>3 (3,0)</td>
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<td>Humanistic-Social Elective$^3$</td>
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<tr>
<td>Technical Elective$^2$</td>
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<tr>
<td>CE 402</td>
<td>Reinforced Concrete Design</td>
<td>3 (2,2)</td>
</tr>
<tr>
<td>CE 425</td>
<td>Engineering Relations</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>CE 499</td>
<td>Civil Engr. Design Proj</td>
<td>3 (2,3)</td>
</tr>
<tr>
<td>ESE 401</td>
<td>Environ. Engr.</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>ME 311</td>
<td>Engineering Thermo. I</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Technical Elective$^3$</td>
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<td>3</td>
</tr>
</tbody>
</table>

18          | 138 Total Semester Hours

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2 Students enrolled in the ROTC program may substitute advanced ROTC courses for EG 110 and 3-credit hours of Technical Electives.
3 Each class adviser has a list of approved electives from which students may make selections. Any exceptions to this list must have the approval of the Department Head.

Note: The first and second semesters of the senior year are interchangeable.

ELECTRICAL AND COMPUTER ENGINEERING

Responsibilities of the electrical and engineering profession range from highly analytical problem solving to detailed design. The department’s name—Electrical and Computer Engineering—is intended to emphasize both the close relationship of computers to all phases of the profession and the major role that computers play in the curriculum at Clemson.

Systems, electronic networks, and electromagnetic fields provide the core curriculum areas. These fundamental studies in analysis and experimentation receive further development in elective courses. Humanistic-social electives provide the graduate with the ability to address himself to the “why” of engineering as well as the “how.”

Students who are interested in communications study information theory, electromagnetic theory, switching circuits, and electronics.

Technological innovations in electronics have resulted in increasingly complex solid-state components—the transistor, integrated circuit, and LSI component. The electronics emphasis includes solid-state devices and circuits and integrated circuit technology.

The department offers courses in real-time computing, computer language structures, theory and design of digital computers, computation and simulation of physical systems, and information processing and data handling.

Energy systems analysis and energy conversion is appropriate for students who plan to work for electric utilities, electrical equipment manufacturers, or companies which are large users of electrical energy.
SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>E&amp;CE 201 Logic and Comp. Dev.</td>
<td>E&amp;CE 202 Electric Circuits I</td>
</tr>
<tr>
<td>ECON 200 Economic Concepts</td>
<td>E&amp;CE 203 Electric Circuits Lab. I</td>
</tr>
<tr>
<td>or ECON 211 Prin. of Econ.</td>
<td>E&amp;CE 250 Principles of Digital</td>
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<tr>
<td>MTHSC 206 Calculus of Sev. Var</td>
<td>Computer Systems</td>
</tr>
<tr>
<td>PHYS 221 Phys. with Cal. II</td>
<td>MTHSC 208 Engineering Math. I</td>
</tr>
<tr>
<td>Literature Requirement</td>
<td>PHYS 222 Phys. with Cal. III</td>
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<td>PHYS 224 Physics Lab. II</td>
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JUNIOR YEAR

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>E&amp;CE 301 Electric Circuits II</td>
<td>E&amp;CE 302 Linear Control Sys.</td>
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<tr>
<td>E&amp;CE 303 Elec. Circuits Lab. II</td>
<td>E&amp;CE 317 Electrical Sys. Analysis</td>
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<tr>
<td>E&amp;CE 320 Electronics I</td>
<td>E&amp;CE 321 Electronics II</td>
</tr>
<tr>
<td>E&amp;CE 325 Electronics Lab. I</td>
<td>E&amp;CE 326 Electronics Lab. II</td>
</tr>
<tr>
<td>E&amp;CE 330 Electrical Sys. Analysis</td>
<td>E&amp;CE 341 Electric and Magnetic</td>
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<tr>
<td>E&amp;CE 340 Electric and Magnetic</td>
<td>Fields II</td>
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<tr>
<td>Statics and Dynamics</td>
<td>E&amp;CE 420 Power Sys. Analysis I</td>
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<td>Humanistic—Social Elective</td>
<td>Technical Elective</td>
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<td><strong>3</strong></td>
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SENIOR YEAR

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<tbody>
<tr>
<td>E&amp;CE 402 Engr. Projects</td>
<td>E&amp;CE 410 Discrete Sys. Design</td>
</tr>
<tr>
<td>E&amp;CE 411 Electrical Systems</td>
<td>E&amp;CE 451 System Design Project</td>
</tr>
<tr>
<td>E&amp;CE 422 Electronics III</td>
<td>Humanistic—Social Elective</td>
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<td>Technical Elective</td>
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<td><strong>17</strong></td>
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</tbody>
</table>

138 Total Semester Hours

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1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2 These courses must be selected from the departmental list of approved humanistic-social electives. The courses must be selected so as to satisfy the college sequence requirements.
3 A minimum of six credits of technical electives must be selected from design courses in the Electrical and Computer Engineering Department. Six credits must be selected from the engineering sciences.
4 Not required of students who complete the ROTC program.

MECHANICAL ENGINEERING

Mechanical engineers are involved in the solution to mankind's basic problems: the maintenance and development of food, shelter, clothing, health, transportation, and communications. These problems require that the mechanical engineer be prepared to work in a wide variety of areas including bioengineering, energy systems, environmental and life support systems, propulsion and transportation systems, food technology, materials processing and manufacturing, construction techniques, and maintenance. Their functions may range from technical management to basic research and development, but they all involve innovative problem-solving skills.

In preparing an individual for a 40-45 year professional career, it is essential to develop the entire person. This involves a balanced program encompassing the humanities, social sciences, communicative skills, basic sciences, engineering sciences, and laboratory
and design experience. The student begins with the basic sciences and communicative skills, progresses through the engineering sciences, and finally applies these principles in such areas as energy conversion and transfer, mechanical design and system analysis. It is in this final stage that the student experiences the relevant problem-solving aspects of engineering.

Most mechanical engineering graduates take positions in industry, government, or business, but many others continue their formal education in a graduate program. The Department of Mechanical Engineering offers study leading to the Master of Engineering, Master of Science, and Doctor of Philosophy degrees.

See page 99 for Freshman year.

SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRE 310 Intro. to Material Sci.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>EM 201 Engr. Mech. (Statics)</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>ME 201 Innovative Design I</td>
<td>2 (1.3)</td>
</tr>
<tr>
<td>MTHSC 206 Calculus of Sev. Var.</td>
<td>4 (4.0)</td>
</tr>
<tr>
<td>PHYS 221 Phys. with Cal. II</td>
<td>3 (2.2)</td>
</tr>
<tr>
<td>Literature Requirement</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td><strong>Total Semester Hours</strong></td>
<td>18</td>
</tr>
</tbody>
</table>

JUNIOR YEAR

| E&CE 307 Basic Elec. Engr. | 2 (2.0) | E&CE 308 Electronics and Electromechanics | 2 (2.0) |
| E&CE 309 Elec. Engr. Lab. I | 1 (0.2) | E&CE 310 Elec. Engr. Lab. II | 1 (0.2) |
| EM 304 Mechanics of Materials | 3 (3.0) | ME 302 Dynamic Sys. and Cont. | 3 (3.0) |
| EM 320 Fluid Mechanics | 3 (3.0) | ME 304 Heat Transfer | 3 (3.0) |
| ME 301 Engr. Systems Analysis | 3 (3.0) | ME 312 Engineering Thermo. II | 3 (3.0) |
| ME 305 Engr. Experimentation | 1 (0.3) | ME 313 Instru. and Meas. | 3 (2.3) |
| ME 311 Engineering Thermo. I | 3 (3.0) | Elective | 3 |
| Humanistic-Social Elective | 3 | **Total Semester Hours** | 19 | 18 |

SENIOR YEAR

| ME 401 Design of Mechanical System Components | 3 (3.0) | ME 402 Innovative Design III | 3 (2.3) |
| ME 405 Kinematics and Dynamics of Machinery | 3 (3.0) | ME 414 Mech. Sys. Lab. | 1 (0.3) |
| and Turbomachinery | 3 (3.0) | or ME 413 Thermal Sys. Lab | 1 (0.3) |
| ME 412 Intro. to Comp. Flow | 3 (3.0) | Humanistic-Social Elective | 3 |
| or ME 414 Mech. Sys. Lab. | 1 (0.3) | Technical Elective | 6 |
| Technical Elective | 3 | **Total Semester Hours** | 16 |
| Humanistic-Social Elective | 3 |

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

Note: All electives must be approved in advance by departmental advisers.
COLLEGE OF FOREST AND RECREATION RESOURCES

The College of Forest and Recreation Resources is concerned with the management, use, and stewardship of all of our forest resources and with individual and societal well-being through wise use of leisure. These two general areas of study offer broad opportunities in the management of our forest and recreation resources for their maximum service to present and future generations.

The College of Forest and Recreation Resources offers curricula designed to prepare students for professional careers in the following areas:

1. The Forest Management curriculum prepares graduates for employment as managers and administrators of forest lands for production of timber, water, wildlife, esthetic values, and recreation use.
2. The Wood Utilization curriculum prepares graduates for careers in the forest products and allied industries in the areas of production, utilization, and marketing of wood and allied products.
3. The Recreation and Park Administration curriculum prepares graduates for careers as managers of leisure-service programs such as those for counties, municipalities, institutions, industries, and voluntary and youth-serving agencies as well as opportunities within park systems at the local, state, or federal levels.

FOREST MANAGEMENT

The Forest Management curriculum combines a broad education in liberal arts and the physical, mathematical, and biological sciences with the applied forestry sciences needed in the management of the forest and forest environment for their products and services. Foresters of professional standing are employed in various capacities by private concerns and by federal, state, and other public agencies.

Because of the nature of their education, foresters are qualified for a broad spectrum of employment possibilities. They may be engaged as managers, administrators, or owners of forest lands or forest-based businesses; as technical specialists in the production of timber, useable water, wildlife, and esthetic values, and in the recreational use of the forest; or as professionals in other areas where the conservation of our natural resources is a matter of concern. Foresters earning advanced degrees find employment in academic work and in research conducted both by public and private agencies.

The undergraduate curriculum provides a strong program in the basic knowledge and skills required of a professional forester. The curriculum is also designed to provide the necessary prerequisites for those students that desire to continue in graduate study. The
Department of Forestry offers graduate programs that lead to a Master of Science in Forestry or a Master of Forestry degree.

The Forest Management curriculum is accredited by the Society of American Foresters.

### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 103 General Biology I</td>
<td>BIOL 104 General Biology II</td>
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<tr>
<td>3 (3.0)</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>BIOL 105 General Biology Lab</td>
<td>CH 102 General Chemistry</td>
</tr>
<tr>
<td>1 (0.3)</td>
<td>4 (3.3)</td>
</tr>
<tr>
<td>CH 101 General Chemistry</td>
<td>EG 105 Engineering Drawing</td>
</tr>
<tr>
<td>4 (3.3)</td>
<td>2 (1.3)</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>3 (3.0)</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>FOR 101 Introduction to Forestry</td>
<td>FOR 102 Introduction to Forestry</td>
</tr>
<tr>
<td>1 (1.0)</td>
<td>1 (1.0)</td>
</tr>
<tr>
<td>MTHSC 106 Cal. of One Var. I</td>
<td>MTHSC 108 Cal. of One Var. II</td>
</tr>
<tr>
<td>4 (4.0)</td>
<td>4 (4.0)</td>
</tr>
<tr>
<td>Elective</td>
<td>Elective</td>
</tr>
<tr>
<td>1</td>
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### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>AGRON 202 Soils</th>
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<tbody>
<tr>
<td>ECON 212 Principles of Economics</td>
<td>3 (3.0)</td>
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<tr>
<td>PHYS 207 General Physics I</td>
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<tr>
<td>Literature Requirement†</td>
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### FORESTRY SUMMER CAMP

<table>
<thead>
<tr>
<th>FOR 251 Forest Plants</th>
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<tbody>
<tr>
<td>FOR 252 Forest Engineering</td>
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<tr>
<td>FOR 253 Forest Mensuration</td>
<td>4</td>
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<tr>
<td>FOR 254 Forest Products</td>
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### JUNIOR YEAR

<table>
<thead>
<tr>
<th>EXST 301 Introductory Statistics</th>
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<tbody>
<tr>
<td>FOR 301 Forest Entomology</td>
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<tr>
<td>FOR 308 Aerial Photos in For.</td>
<td>3 (2.3)</td>
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<tr>
<td>FOR 415 For. Wildlife Mgt.</td>
<td>3 (2.3)</td>
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### SENIOR YEAR

<table>
<thead>
<tr>
<th>FOR 401 Harvesting For. Prod.</th>
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<tbody>
<tr>
<td>FOR 407 Forest Pathology</td>
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<tr>
<td>FOR 417 Forest Mgt. and Reg.</td>
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<tr>
<td>FOR 420 Forest Products</td>
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<td><strong>Total:</strong> 18</td>
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</table>

148 Total Semester Hours

† To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

2 Any 300- or 400-level course or as specifically approved by the class adviser.

Notes: The emphasis areas are Forest Management, Forest Economics and Marketing, Forest Biology, Forest Wildlife Management, Forest Recreation, Forest Harvesting, Forest Influences, Forest Protection, Forest Biometrics, Forest Soils, Humanities, and Wood Utilization. The student selects one of these and in consultation with an academic adviser schedules approved courses for that particular emphasis area.

No credit will be allowed in the Forest Management curriculum for ENGL 100 or MTHSC 100 to satisfy requirements for graduation.
WOOD UTILIZATION

The Wood Utilization curriculum combines a broad education in the sciences and humanities. Emphasis in the professional courses is placed on the role of wood as a basic forest resource. Graduates are employed by wood-using industries and their suppliers, research laboratories, trade associations, and state and federal organizations.

The core curriculum allows for emphases in three areas of specialization: Wood Science, Wood Industries Management, and Forest Management. Wood Science deals with the properties and processing of wood, wood fiber, and products derived from wood. Wood Industries Management prepares students for the managerial aspects of forest products industries, including marketing and technical services. Twelve credit hours, listed as emphasis areas in the core curriculum qualify a student as a participant in one of the two areas. The area of interest could be explored in more depth through use of the remaining elective credits.

Successful completion of the curriculum leads to a Bachelor of Science degree in Wood Utilization. Graduate programs leading to the Master of Science and Master of Forestry degrees with a specialization in Wood Utilization are also offered.

<table>
<thead>
<tr>
<th></th>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>BIOL 103 General Biology</td>
<td>3 (3.0)</td>
<td>BIOL 104 General Biology II</td>
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<tr>
<td>BIOL 105 General Biology Lab</td>
<td>1 (0.3)</td>
<td>CH 102 General Chemistry</td>
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<tr>
<td>CH 101 General Chemistry</td>
<td>4 (3.3)</td>
<td>EG 105 Engineering Drawing</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>3 (3.0)</td>
<td>ENGL 102 English Composition</td>
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<tr>
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<td>MTHSC 106 Cal. of One Var.</td>
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<tr>
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<td>ECON 212 Principles of Economics</td>
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<td>FOR 222 Wood Properties II</td>
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| FORESTRY SUMMER CAMP | | |
|----------------------|-----------------|
| FOR 253 Forest Mensuration | 4 |
| FOR 254 Forest Products | 1 |
| FOR 255 Secondary Wood Products | 1 |
|             | **6** |

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>ENGL 314 Technical Writing</td>
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<td>FOR 306 Wood and Wood Fiber Identification</td>
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<td>FOR 325 Wood Chemistry</td>
<td>3 (2.3)</td>
<td>FOR 310 Silviculture</td>
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<td>FOR 327 Wood Processing I</td>
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SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
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<tr>
<td>ENGL 301 Public Speaking</td>
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<td>FOR 401 Harv. For. Products I</td>
<td>2 (1.3)</td>
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<tr>
<td>FOR 420 Forest Products</td>
<td>3 (2.3)</td>
</tr>
<tr>
<td>FOR 429 Wood Design</td>
<td>3 (2.3)</td>
</tr>
<tr>
<td>IM 304 Stat. Quality Control</td>
<td>3 (3.0)</td>
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<table>
<thead>
<tr>
<th>Course</th>
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<tr>
<td>FOR 411 Harv. For. Products II</td>
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<tr>
<td>FOR 430 Composite Wood Materials</td>
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<tr>
<td>FOR 433 Merchandising of For. Prod.</td>
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</tr>
<tr>
<td>FOR 434 Foreign Woods and Their Prop.</td>
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<td>Approved Elective</td>
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<td><strong>Total</strong></td>
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</table>

144 Total Semester Hours

Notes: The emphasis areas are Wood Industries Management, Wood Science, and Forest Management. The student selects one of these and in consultation with an academic adviser schedules approved courses for that particular emphasis area.

No credit will be allowed in the Wood Utilization curriculum for ENGL 100 or MTHSC 100 to satisfy requirements for graduation.

RECREATION AND PARK ADMINISTRATION

The curriculum in Recreation and Park Administration prepares students for a variety of careers in leisure-service agencies. The undergraduate curriculum is designed to provide a broad exposure to the social, physical and biological sciences as well as develop the basic knowledge and skills required to manage and administer leisure-service resources.

Flexibility within the curriculum is achieved by permitting the student to select coursework from among several emphasis areas that include Community Leisure Services, Recreation Resource Management, and Therapeutic Recreation. The latitude in selection permits maximum accommodation of the individual student's interests and professional career objectives. Students may complete requirements for a minor which is appropriate to his/her emphasis area.

Graduate study leading to a Master of Recreation and Park Administration degree is also offered by the Department.

FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>BIOL 103 General Biology I</td>
<td>BIOL 104 General Biology II</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>HIST 102 History of the U.S.</td>
<td>MTHSC 101 Finite Probability</td>
</tr>
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<td>RPA 101 Intro. to Leisure Ser.</td>
<td>RPA 205 Leisure Programs I</td>
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SOPHOMORE YEAR

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<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tr>
<td>PSYCH 201 General Psychology</td>
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<td>RPA 203 Personal and Com.</td>
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<td>Health</td>
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<td>RPA 206 Leisure Programs II</td>
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<tr>
<td>ECON 200 Economic Concepts</td>
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<td>HUM 201 or 202 Intro. to Hum.</td>
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<tr>
<td>RPA 207 Leisure Programs III</td>
<td>1 (0.3)</td>
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<tr>
<td>SOC 201 Sociological Perspective</td>
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<td>Course Code</td>
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<td>-------------</td>
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<tr>
<td>ENGL 301</td>
<td>Public Speaking</td>
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<td>RPA 308</td>
<td>Leadership and Group Processes in Recreation</td>
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<td>RPA 311</td>
<td>Therapeutic Recreation</td>
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**SUMMER**

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<tr>
<td>RPA 405</td>
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**SENIOR YEAR**

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<tbody>
<tr>
<td>RPA 403</td>
<td>Elements of Recreation and Park Planning</td>
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<td>RPA 409</td>
<td>Meth. of Rec. Research</td>
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</table>

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2 Two-semester sequences in astronomy, chemistry, geology, physical science, physics, or ZOOL 222, 223.
3 The emphasis areas in the Department of Recreation and Park Administration include Community Leisure Services, Recreation Resource Management, and Therapeutic Recreation. The student selects one of these areas and in consultation with an academic adviser schedules the required and approved courses for that particular emphasis area.

135 Total Semester Hours
COLLEGE OF INDUSTRIAL MANAGEMENT AND TEXTILE SCIENCE

The programs of the College of Industrial Management and Textile Science embrace three major areas: teaching, research, and public service. The College is responsible for seven graduate programs (two in cooperation with other administrative units), nine undergraduate programs, and a series of professional development courses for business and industry. The undergraduate curricula are in the areas of Accounting, Administrative Management, Economics, Financial Management, Industrial Management, Textile Chemistry, Textile Science, and Textile Technology. These curricula are designed to prepare the students for a variety of careers, as well as to furnish an education on which to build for a lifetime. The curricula recognize the need for an understanding of the basic principles of science and appreciation for the nature of human beings, and the comprehension of the economic, political, and social environment. Flexibility in course selection and choice of areas for emphasis is made possible by secondary concentrations and minors as indicated.

ACCOUNTING

This curriculum leads to the Bachelor of Science degree in Accounting. The degree program is accredited by the American Assembly of Collegiate Schools of Business and is designed to prepare students for professional careers in accounting and management. The major study of accounting is well supported by sequential courses in English, mathematics, management, and economics.

The graduate in Accounting is well prepared for entrance in law school, graduate school, or the practice of accountancy, either public, private, or governmental. The study of accounting in preparation for a career in other areas of management will provide mastery over an essential tool which reinforces experience and judgment in the decision-making process.

FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>CPSC 120 Intro. to Infor. Proc. Sys.</td>
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<tr>
<td>ECON 211 Principles of Economics</td>
<td>3 (3.0)</td>
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<tr>
<td>ENGL 101 English Composition</td>
<td>3 (3.0)</td>
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<tr>
<td>MTHSC 106 Cal. of One Var. I</td>
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<tr>
<td>Science Elective(^2)</td>
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| CPSC 130 Data Proc. with Cobol    | 3 (3.0)           |
| ECON 212 Principles of Economics | 3 (3.0)          |
| ENGL 102 English Composition     | 3 (3.0)          |
| MTHSC 108 Cal. of One Var. II    | 4 (4.0)          |
| Science Elective\(^2\)            | 4                |
|                              | 17               |

\(^2\) No curriculum in the College of Industrial Management and Textile Science leading to the BA, BS, or BTT degree will allow credit for either ENGL 100, MTHSC 100 or 105 to be used to satisfy requirements for graduation.

Note: No curriculum in the College of Industrial Management and Textile Science leading to the BA, BS, or BTT degree will allow credit for either ENGL 100, MTHSC 100 or 105 to be used to satisfy requirements for graduation.
SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
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<tbody>
<tr>
<td>ACCT 201 Principles of Accounting</td>
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<td>MTHSC 210 Applied Matrix Algebra</td>
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<td>SOC 201 Sociological Perspective</td>
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<tr>
<td>History Elective</td>
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<td>Literature Elective¹</td>
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JUNIOR YEAR

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<td>ACCT 301 Intermed. Accounting</td>
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<td>ECON 314 Inter. Econ. Theory</td>
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<td>ENGL 301 Public Speaking</td>
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<td>FIN 306 Corporation Finance</td>
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<td>IM 301 Principles of Management</td>
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<td>MTHSC 405 Statistical Theory and Methods II</td>
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SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>ACCT 305 Income Taxation</td>
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<td>ACCT 410 Budgeting and</td>
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<td>ACCT 411 Advanced Accounting</td>
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<td>ACCT 415 Auditing</td>
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<td>IM 400 Mgt. of Org. Behavior</td>
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<tr>
<td>LAW 312 Commercial Law</td>
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</table>

132 Total Semester Hours

¹ To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
² Science elective includes any natural or physical science.

Notes:
1. Accounting majors are required to earn a grade of C or higher in all prerequisite accounting courses in order to be eligible for enrollment in the next higher-level accounting course.
2. ENGL 100 and any mathematical sciences credits on a level lower than MTHSC 106 may not be counted in computing the minimum number of credit hours required for graduation with a BS in Accounting degree.

ADMINISTRATIVE MANAGEMENT

The Bachelor of Science degree in Administrative Management is designed for those students interested in careers as professional managers in the less technical areas of management. The program is accredited by the American Assembly of Collegiate Schools of Business. Such areas include marketing, personnel administration, purchasing, and public administration at the local, state and national levels. In addition, the qualified graduate of this curriculum will have a background suitable for pursuing graduate study in such areas as marketing, transportation, finance, and economics, as well as the behavioral sciences.

The program of study included in the Administrative Management curriculum is designed to provide the student with (1) an appreciation of the social, political, and economic environments in which business firms must operate; (2) knowledge of the functional areas of business, their interrelationship and use of analytical methods in solving problems; and (3) a facility in the use of mathematics, statistics, and the behavioral sciences in performing managerial functions.
### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPSC 120 Intro. to Info. Proc. Sys.</td>
<td>ECON 211 Principles of Economics</td>
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<tr>
<td>ENGL 101 English Composition</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>HIST 173 Western Civilization</td>
<td>HIST 173 Western Civilization</td>
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<tr>
<td>Science Elective3</td>
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<tr>
<td>Elective</td>
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</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>17</td>
</tr>
</tbody>
</table>

### SOPHOMORE YEAR

| ACCT 201 Principles of Accounting                   | ACCT 202 Principles of Accounting                   |
| ECON 212 Principles of Economics                    | ECON 301 Economics of Labor                          |
| MTHSC 301 Statistical Theory and Methods I          | IM 304 Stat. Quality Control                         |
| PSYCH 201 General Psychology                        | SOC 201 Sociological Perspective                     |
| Literature Requirement1                             | Elective                                             |
| Elective                                            | 4                                                   |
|                                                     | 16                                                  |

### JUNIOR YEAR

| ACCT 303 Cost Accounting                            | ACCT 410 Budgeting and                              |
| IM 301 Principles of Management                     | Executive Control                                    |
| IM 308 Principles of Marketing                      | ENGL 304 Advanced Composition                        |
| LAW 322 Legal Environ. of Bus.                      | FIN 306 Corporation Finance                          |
| MASC 310 Intro. to Mgt. Sci.                        | IM 307 Personnel Management                          |
| Elective                                            | Elective                                             |
|                                                     | 4                                                   |
|                                                     | 16                                                  |

### SENIOR YEAR

| ENGL 301 Public Speaking                            | IM 407 Directed Research                            |
| IM 418 Management Inform. Sys.                     | IM 412 Marketing Management                          |
| IM 499 Computer Utilization II                      | IM 415 Business Policy                               |
| Management Option4                                 | Approved Elective5                                   |
|                                                     | 9                                                   |
|                                                     | 16                                                  |

132 Total Semester Hours

---

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2 Credits earned in MTHSC 106, 108 may be substituted for MTHSC 102, 207, and elective credits.
3 To be selected from a two-semester sequence: CH 101, 102; BIOL 103, 104; or PHYS 207, 208.
4 Management Options. In the senior year a student must complete one of two management options. To receive credit, at least two courses in the option must be completed.
Regional Analysis: IM 404 and 405 or 406.
Logistics: IM 417 and ECON 419 or IM 420.
5 Approved Elective. One course from each of the three areas listed is required for the nine hours of approved electives. Six hours of free electives must be in nonbusiness areas.
Marketing: IM 401, 413, 419, 421.
Management: Any senior-level course in the Department of Industrial Management.

**ADMINISTRATIVE MANAGEMENT—OCCUPATIONAL SAFETY AND HEALTH MAJOR**

The Bachelor of Science degree in Administrative Management with Occupational Safety and Health major is designed for those students interested in careers as professional managers. This concentration provides the student with an indepth knowledge of the field of occupational safety and health. It prepares the student to fulfill industry's increasing need for managers and coordinators of safety programs. While concentrated, the course of study is designed to
prepare students for careers in the less technical areas of management in the following areas: personnel management, marketing, purchasing, and public administration at the local, state, and federal levels. In addition, the qualified graduate of this curriculum will have a background suitable for pursuing graduate study in such areas as marketing, transportation, finance, business administration, the behavioral sciences, and economics.

**FRESHMAN YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH 101 General Chemistry</td>
<td>CH 102 General Chemistry</td>
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<tr>
<td>ENGL 101 English Composition</td>
<td>CPSC 120 Intro. to Infor. Proc.</td>
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<td>MTHSC 102 Intro. to Meth. Anal.</td>
<td>ECON 211 Principles of Economics</td>
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<tr>
<td>POSC 101 Amer. Natl. Govt.</td>
<td>ENGL 102 English Composition</td>
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<tr>
<td>History Elective</td>
<td>MTHSC 207 Multivariable Cal.</td>
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**SOPHOMORE YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 201 Principles of Accounting</td>
<td>ACCT 202 Principles of Accounting</td>
</tr>
<tr>
<td>ECON 212 Principles of Economics</td>
<td>ENGL 301 Public Speaking</td>
</tr>
<tr>
<td>MTHSC 301 Statistical Theory and Methods I</td>
<td>IM 304 Stat. Quality Control</td>
</tr>
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<td>PSYCH 201 General Psychology</td>
<td>PSYCH 301 Industrial Psychology</td>
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<td>Literature Requirement</td>
<td>SH 201 Scope of Occupational</td>
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<td>Elective</td>
<td>Safety and Health</td>
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**JUNIOR YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN 306 Corporation Finance</td>
<td>ENGL 304 Advanced Composition</td>
</tr>
<tr>
<td>IM 301 Principles of Management</td>
<td>or ENGL 314 Technical Writing</td>
</tr>
<tr>
<td>MASC 310 Intro. to Mgt. Sci.</td>
<td>IM 307 Personnel Management</td>
</tr>
<tr>
<td>SH 301 Industrial Accident Prevention and Loss Control I</td>
<td>SH 302 Industrial Accident Prevention and Loss Control II</td>
</tr>
<tr>
<td>SH 303 Intro. to Ind. Hygiene</td>
<td>SH 304 Ind. Hygiene Practice</td>
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<tr>
<td>Economics Elective</td>
<td>Economics Elective</td>
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<td>3 (3,3)</td>
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<tr>
<td>18</td>
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</tbody>
</table>

**SENIOR YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>IM 418 Management Inform. Sys.</td>
<td>IM 407 Directed Research</td>
</tr>
<tr>
<td>IM 499 Computer Utilization II</td>
<td>IM 415 Business Policy</td>
</tr>
<tr>
<td>SH 401 Fund. of Fire and Explosion</td>
<td>SH 404 Seminar in Safety and Health</td>
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<td>Elective</td>
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<tr>
<td>136 Total Semester Hours</td>
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</tr>
</tbody>
</table>

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2 Credits earned in MTHSC 102 and 105 may be substituted for MTHSC 102, 207.
3 (MTHSC 100 and 105 are not counted in degree requirements.)
3 To be selected from the following: HIST 101, 102, 172, 173, 304, 306.
4 Select at least two of the following: ECON 301, 306, 308, 309, 314, 420, 424, IM 404.

**ECONOMICS**

A bachelor's degree in Economics provides a thorough understanding of the economic system and prepares the student for a broad choice of career opportunities. By combining general education
courses, a minor or option, and a strong major in economics, students can prepare themselves for specialized graduate studies and careers in business and government.

The Department of Economics offers two degree paths for the undergraduate. The Bachelor of Arts degree is distinguished by its emphasis on the language skills and the humanities. A broad choice of minors is available for this program. The Bachelor of Science program emphasized quantitative skills and particular preparation for careers in business and offers a structured selection of options.

### BACHELOR OF ARTS IN ECONOMICS

#### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 101 English Composition</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>HIST 172 Western Civilization</td>
<td>HIST 173 Western Civilization</td>
</tr>
<tr>
<td>MTHSC 102 Intro. to Math. Anal.</td>
<td>MTHSC 101 Finite Probability</td>
</tr>
<tr>
<td>Modern Language</td>
<td>Modern Language</td>
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<tr>
<td>Natural Science</td>
<td>Natural Science</td>
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<td>Elective</td>
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#### SOPHOMORE YEAR

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>ECON 211 Principles of Economics</td>
<td>ECON 212 Principles of Economics</td>
</tr>
<tr>
<td>HIST 101 History of the U.S.</td>
<td>HIST 102 History of the U.S.</td>
</tr>
<tr>
<td>Literature Requirement</td>
<td>Literature Requirement</td>
</tr>
<tr>
<td>Modern Language</td>
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</tr>
<tr>
<td>Elective</td>
<td>Elective</td>
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#### JUNIOR YEAR

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>ACCT 200 Basic Accounting</td>
<td>ECON 407 National Income and</td>
</tr>
<tr>
<td>or ACCT 201 Prin. of Acct.</td>
<td>Employment Analysis</td>
</tr>
<tr>
<td>ECON 314 Inter. Econ. Theory</td>
<td>Humanities</td>
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<td>Humanities</td>
<td>Major</td>
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<tr>
<td>Major</td>
<td>Minor</td>
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<td>Minor</td>
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#### SENIOR YEAR

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<tbody>
<tr>
<td>Major</td>
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<td>Minor</td>
<td>Elective</td>
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<tr>
<td>Approved Elective</td>
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</table>

**130 Total Semester Hours**

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1. To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2. The sequence MTHSC 101, 102, 203, 207 may be replaced either by MTHSC 102, 207, 210, 301 or 106, 207, 210, 301.
3. Two courses, totaling eight hours, in the same science are required.
4. Students minoring in Political Science, Psychology, or Sociology may substitute POSC 101 or 201; PSYCH 201, 263; or SOC 201, 202 for HIST 101, 102.
5. To be selected from English, humanities, modern language, music, philosophy, religion, visual arts.
6. Twenty-four semester hours in economics above the sophomore level are required, including ECON 314 and 407. ECON 101 and 203 do not count toward the major. Major credit may include up to 6 hours selected from HIST 306, IM 404, 406, MASC 311, and SE 484.

Those seeking teacher certification will be required to complete more than 130 semester hours.
MINOR CONCENTRATIONS

Any minor approved by the College of Liberal Arts, including the Cluster Minor, and any minor concentration offered by any other department in the College of Industrial Management and Textile Science is acceptable as a minor for the bachelor of Arts curriculum in Economics.

Students who wish to combine the curriculum in Economics with secondary school teaching should elect to take the degree in Education with a teaching area in Economics. The courses will be those required for teaching certification as specified by the South Carolina Department of Education as well as those economics courses required for an Economics major. Requirements for a major in Education with a teaching area in Economics are shown under the College of Education.

A minor in Economics is provided for other degree programs consisting of 15 hours above the sophomore level which must include ECON 314 and 407.

BACHELOR OF SCIENCE IN ECONOMICS

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACCT 201 Principles of Accounting</strong></td>
<td><strong>ACCT 202 Principles of Accounting</strong></td>
</tr>
<tr>
<td><strong>ENGL 101 English Composition</strong></td>
<td><strong>ENGL 102 English Composition</strong></td>
</tr>
<tr>
<td><strong>HIST 172 Western Civilization</strong></td>
<td><strong>HIST 173 Western Civilization</strong></td>
</tr>
<tr>
<td>MTHSC 106 Cal. of One Var.</td>
<td>MTHSC 207 Multivariable Calculusκ</td>
</tr>
<tr>
<td>Natural Science^</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
<td>17</td>
</tr>
</tbody>
</table>

SOPHOMORE YEAR

| CPSC 110 Elem. Comp. Prog. | 3 (3.0) |
| or CPSC 120 Intro. to Inf. | 3 (3.0) |
| ECON 211 Principles of Economics | 3 (3.0) |
| MTHSC 301 Statistical Theory and Methods | 3 (3.0) |
| Literature Requirement | 3 (3.0) |
| Social Science Elective^ | 3 |
| Elective | 1 |
| **Total** | 16 |

JUNIOR YEAR

| ECON 314 Inter. Econ. Theory | 3 (3.0) |
| or LAW 322 Legal Environment of Business | 3 (3.0) |
| Major^ | 3 |
| Option | 3 |
| Elective | 4 |
| **Total** | 16 |

SENIOR YEAR

| Major^ | 6 |
| Option | 6 |
| Elective | 6-8 |
| **Total** | 17 |

132 Total Semester Hours
OPTIONS

Rather than having a minor or secondary concentration as in the Bachelor of Arts program in Economics, a student in the Bachelor of Science program selects one of several options. These options generally consist of 15 hours of a certain core of study. It is felt that these options might be particularly appealing to certain students with definite vocational interests. Also, an appropriately chosen option would greatly facilitate moving into a Master of Business Administration program in graduate school or law school.

Students enrolling in the Bachelor of Science program in Economics may select from the following options.

<table>
<thead>
<tr>
<th>Accounting</th>
<th>Management Science</th>
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<tbody>
<tr>
<td>ACCT 301 Inter. Accounting ........... 3 (3,0)</td>
<td>ACCT 303 Cost Accounting ........... 3 (3,0)</td>
</tr>
<tr>
<td>ACCT 302 Inter. Accounting ........... 3 (3,0)</td>
<td>or ACCT 305 Income Taxation ........... 3 (3,0)</td>
</tr>
<tr>
<td>ACCT 303 Cost Accounting ........... 3 (3,0)</td>
<td>or LAW 312 Commercial Law ........... 3 (3,0)</td>
</tr>
<tr>
<td>and ACCT 305 Income Tax ........... 3 (3,0)</td>
<td>MASC 311 Intro. to Econometrics ....... 3 (3,0)</td>
</tr>
<tr>
<td>or ACCT 411 Advanced Acct ........... 3 (3,0)</td>
<td>MASC 413 Management Sci. I ........... 3 (3,0)</td>
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<tr>
<td>and ACCT 415 Auditing ........... 3 (3,0)</td>
<td>Quantitative Elective* ........... 6</td>
</tr>
<tr>
<td>LAW 313 Commercial Law ........... 3 (3,0)</td>
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<table>
<thead>
<tr>
<th>Computer Science</th>
<th>Mathematical Sciences—Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPSC 130 Data Processing with Cobol ........... 3 (3,0)</td>
<td>ECON 430 Mathematical Economics ....... 3 (3,0)</td>
</tr>
<tr>
<td>CPSC 210 Programming Meth ........... 3 (3,0)</td>
<td>MASC 311 Intro. to Econometrics ....... 3 (3,0)</td>
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<tr>
<td>IM 299 Computer Utilization I ........... 1 (0,3)</td>
<td>MTHSC 405 Stat. Theory and Meth. II ....... 3 (3,0)</td>
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<td>IM 418 Management Inform. Sys ........... 3 (3,0)</td>
<td>MTHSC 411 Linear Algebra ........... 3 (3,0)</td>
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<tr>
<td>and IM 499 Comp. Util. II ........... 1 (1,0)</td>
<td>MTHSC 452 Linear Programming ........... 3 (3,0)</td>
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<tr>
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<tr>
<th>Environmental Studies</th>
<th>Public Administration*</th>
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<tbody>
<tr>
<td>AGEC 403 Land Economics ....... 3 (3,0)</td>
<td>POSS 302 State and Local Govt. ....... 3 (3,0)</td>
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<tr>
<td>BOT 145 Environmental Dynamics ....... 2 (2,0)</td>
<td>POSS 321 Gen. Public Admin. ....... 3 (3,0)</td>
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<td>CRD 357 Nat. Res. Economics ....... 3 (3,0)</td>
<td>POSS 422 Prob. of Pub. Admin. ....... 3 (3,0)</td>
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<tr>
<td>ENSC 471 Man and His Environ. ....... 2 (2,0)</td>
<td>POSS 423 Municipal Admin. ....... 3 (3,0)</td>
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<td>ENSC 472 Environ. Plan. and Cont. ........... 2 (2,0)</td>
<td>POSS 425 Govt. Budget. Process ....... 3 (3,0)</td>
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<td>FOR 304 Forest Economics ....... 3 (3,0)</td>
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<tr>
<th>Social Science</th>
<th>Textile Science</th>
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<tbody>
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<td>HIST 306 Amer. Econ. Develop. ....... 3 (3,0)</td>
<td>TEXT 122 Intro. to Textiles ....... 2 (1,3)</td>
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<td>POSS 321 Gen. Public Admin. ....... 3 (3,0)</td>
<td>TEXT 305 Basic Fibers ....... 3 (3,0)</td>
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<tr>
<td>or POSC 361 Inter. Politics ....... 3 (3,0)</td>
<td>TEXT 306 Yarn Formation ....... 3 (3,0)</td>
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<tr>
<td>SOC 351 Industrial Sociology ....... 3 (3,0)</td>
<td>TEXT 313 Fabric Formation ....... 3 (3,0)</td>
</tr>
<tr>
<td>Elective* ........... 6</td>
<td>TEXT 314 Dyeing and Finishing ....... 3 (3,0)</td>
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<td><strong>Total</strong> 15</td>
<td>TEXT 475 Textile Marketing ....... 3 (3,0)</td>
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Urban Studies
CRD 411 Regional Impact Analysis . 3 (2.3)
ECON 421 Urban Economics ........... 3 (3.0)
IM 406 Theory of Industrial Location 3 (3.0)
SOC 206 Intro. to Methods of Research ............................................. 3 (3.0)
SOC 331 Urban Sociology ............... 3 (3.0)

15

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2 Two courses totaling eight hours, excluding PHYS 101 and 102, are required.
3 The sequence of MTHSC 106, 207, 210, 301 may be replaced by MTHSC 102, 207, 210, 301 or 101, 102, 203 and 207.
4 CPSC 110 should be selected for the Computer Science and Mathematical Sciences—Statistics options.
5 CPSC 120 should be selected for the Management Science and Accounting options.
6 Twenty-four hours in economics above the sophomore level are required, including ECON 314 and 407.
7 Students in the Accounting option should select LAW 312 in lieu of LAW 322 in the junior year.
8 To be selected from the following: ECON 430, IM 404, MASC 414, MTHSC 405.
9 Students in the Public Administration option are required to take POSC 101 and 201; ECON 420 and 421 are to be included in the major.
10 Select from 300- and 400-level computer science courses.

FINANCIAL MANAGEMENT

The degree program for the Bachelor of Science in Financial Management is accredited by the American Assembly of Collegiate Schools of Business. The curriculum provides the student with a course of study in preparation for a career in such areas as banking, insurance, brokerage and related activities. The student should be well prepared to serve on the financial staff of practically any business firm for the purpose of planning, providing, and controlling the capital of the firm. This curriculum should also prepare the student for service in government and agencies and programs of government. The graduate with this degree should be adequately prepared for entrance in law or graduate school.

The coursework consists largely of courses in English, mathematics, accounting, economics, management, and the social sciences. The special interests of the individual student may be pursued through elective credit.

FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 211 Principles of Economics . 3 (3.0)</td>
<td>CPSC 120 Intro. to Infor. Proc. Sys. 3 (3.0)</td>
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<tr>
<td>ENGL 101 English Composition ...... 3 (3.0)</td>
<td>ECON 212 Principles of Economics . 3 (3.0)</td>
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<tr>
<td>MTHSC 102 Intro. to Math. Anal. 2 ...... 3 (3.0)</td>
<td>ENGL 102 English Composition ...... 3 (3.0)</td>
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<tr>
<td>POSC 101 American Natl. Govt. ...... 3 (3.0)</td>
<td>MTHSC 207 Multivariable Cal. 3 ...... 3 (3.0)</td>
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<tr>
<td>SOC 201 Sociological Perspective ... 3 (3.0)</td>
<td>PSYCH 201 General Psychology ..... 3 (3.0)</td>
</tr>
<tr>
<td>Elective$^3$ .................................. 1</td>
<td>Elective$^3$ .................................. 1</td>
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</tr>
</tbody>
</table>

SOPHOMORE YEAR

| ACCT 201 Principles of Accounting . 3 (3.0) | ACCT 202 Principles of Accounting . 3 (3.0) |
| MTHSC 301 Statistical Theory and Methods I .......................... 3 (3.0) | MASC 310 Intro. to Mgt. Science ...... 3 (3.0) |
| History Elective .................................. 3 (3.0) | Literature Requirement$^1$ ............ 3 (3.0) |
| Literature Requirement$^1$ .................. 3 (3.0) | Elective$^3$ .................................. 6 |
| Elective$^3$ .................................. 4 | | 15 |
| | | 16 |
### JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ACCT 301 Intermediate Accounting</td>
<td>3</td>
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<tr>
<td>ECON 302 Money and Banking</td>
<td>3</td>
</tr>
<tr>
<td>ECON 314 Inter. Econ. Theory</td>
<td>3</td>
</tr>
<tr>
<td>FIN 306 Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>IM 301 Principles of Management</td>
<td>3</td>
</tr>
<tr>
<td>LAW 312 Commercial Law</td>
<td>3</td>
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<td><strong>Total</strong></td>
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</table>

### SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 305 Income Taxation</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 301 Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>FIN 310 Prob. in Fin. Mgmt</td>
<td>3</td>
</tr>
<tr>
<td>FIN 402 Capital Budgeting</td>
<td>3</td>
</tr>
<tr>
<td>IM 402 Oper. Plan and Control</td>
<td>3</td>
</tr>
<tr>
<td>Restricted Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

### Notes:
1. To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2. Credits earned in MTHSC 106 and 108 may be substituted for MTHSC 102 and 207.
3. Nine elective credits must be in non-business areas. (Elective hours may be taken in any combination of 1-3, 4-hour courses.)
4. ACCT 303 may be substituted for ACCT 307 only if ACCT 410 is also taken as a Restricted Elective.
5. Five Restricted Elective credits must be completed from the following:
   (1) any 300- and 400-level courses offered by the Department of Accounting and Finance, except as noted in footnote 4 above; and (2) the following courses: CPSC 130, 151, and 155 (both), E&C 470, ECON 305, 306, 412, 430, MASC 311, 413, 414.

### INDUSTRIAL MANAGEMENT

This curriculum is designed to adequately prepare students for positions of major management responsibility in the technologically oriented industries. The program is accredited by the American Collegiate Schools of Business. Graduates are sought for positions as projects directors by various government agencies and have successfully filled a wide variety of positions in industry and government research centers. Banks and financial institutions also utilize the Industrial Management graduate in a liaison role as between them and their technologically oriented business customers. The degree offers an unexcelled background for those interested in careers as technical sales representatives.

During the first year, education in the mathematical and physical sciences is emphasized. In the second, third, and senior years, the student's work expands into the areas of industrial engineering, financial management, and the social sciences.

### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH 101 General Chemistry</td>
<td>CH 102 General Chemistry</td>
</tr>
<tr>
<td>EG 109 Engineering Graphics</td>
<td>ECON 211 Principles of Economics</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>HIST 173 Western Civilization</td>
<td>MTHSC 108 Cal. of One Var. II</td>
</tr>
<tr>
<td>MTHSC 106 Cal. of One Var. I</td>
<td>PHYS 207 General Physics I</td>
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<td><strong>Total</strong></td>
<td><strong>Total</strong></td>
</tr>
<tr>
<td>16</td>
<td>18</td>
</tr>
</tbody>
</table>
SOPHOMORE YEAR

ACCT 201 Principles of Accounting . 3 (3.0)  
ECON 212 Principles of Economics . 3 (3.0)  
ENGR 220 Tech. in Mod. World ......... 3 (3.0)  
MTHSC 210 Applied Matrix Alg. ...... 3 (3.0)  
MTHSC 301 Statistical Theory and Methods I ........................................... 3 (3.0)  
PSYCH 201 General Psychology .... 3 (3.0)  

18

JUNIOR YEAR

ACCT 307 Managerial Accounting ... 3 (3.0)  
ENGL 304 Advanced Composition .... 3 (3.0)  
IM 299 Computer Utilization I ...... 1 (0.3)  
IM 301 Principles of Management ... 3 (3.0)  
IM 308 Principles of Marketing ...... 3 (3.0)  
Elective .......................... 3  

16

SENIOR YEAR

ENGL 301 Public Speaking .......... 3 (3.0)  
IM 402 Oper. Plan. and Control ... 3 (3.0)  
IM 408 Work Simplification and Standardization ..................................... 3 (3.0)  
MASC 414 Statistical Analysis .... 3 (3.0)  
Area Concentration2 ................ 3  
or Technical Elective2 ............... 3  
Elective .......................... 3  

18

136 Total Semester Hours

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2 The student is encouraged to select an area concentration. He may, with the approval of his adviser, select instead nine credits from an approved technical elective list.

AREA CONCENTRATIONS

During the junior and senior years students are encouraged to select from one of the following areas for the purpose of emphasizing a particular phase of the curriculum. Computer programming and application are stressed in all upper division courses: Biological Sciences, Ceramics, Defense Studies, Economics, Environmental Science, Health and Hospital Administration, Human Resources, Industrial Engineering, Industrial Statistics, Management Science, Marketing Analysis, Regional Science, and Textiles.

TEXTILE CHEMISTRY, TEXTILE SCIENCE, AND TEXTILE TECHNOLOGY PROGRAMS

The textile student studies the polymer synthesis of fibers by man or nature, the processes for converting these fibers into a textile structure, the science of the addition of coloring agents and finishes to improve the desirability, and the test methods for evaluating the performance of textile products.

Graduates of the Textile Department hold jobs with responsibilities in corporate management, sales, manufacturing management, de-
sign, research, development, technical service, quality control, and personnel management. They create new products and processes and solve problems. They create styles, patterns, textures, and colors for apparel, home, and industrial use as well as special application. They deal with computers, automation, product quality, plant performance, environmental control, and consumer safety.

The textile industry has a continuing need for technically trained men and women to help it meet sociologically desirable standards such as those required by the Occupational Safety and Health Act, the Consumer Product Safety Commission, and the Environmental Protection Agency. In addition, there is a need to reduce costs and increase exports, and to develop new fibers and fabrics to satisfy the whims of fashion.

In the textile curricula a broad background is stressed, with as much as two-thirds of the courses coming from the large resources of the University outside the department. In addition, the 34 hours of electives permit the student to gain expertise in related fields.

The Textile Department offers three undergraduate degrees which differ in the content of science and business courses. The BS in Textile Chemistry and the BS in Textile Science are both based on the three sciences: chemistry, physics, and mathematics. With this firm base, the graduate is able to apply scientific knowledge to the solution of problems involving both chemical and physical principles. The graduates will be concerned with the conception, design, construction, and management of complete systems of labor, machinery and processes for the most efficient production of textiles or related chemicals. These two courses differ in that Textile Chemistry has a greater emphasis on chemistry, and Textile Science has a greater emphasis on yarn and fabric formation. Both curricula prepare one for graduate study in textiles.

The Bachelor of Textile Technology program has as its core the desirable business and humanistic courses in economics, management, sociology, and psychology that prepare the graduate to begin a career as a production manager with a textile manufacturing firm. It is less well adapted to train one for graduate work, but with proper choice of electives a student can prepare himself for graduate school in certain areas.

The Textile Department also offers advanced degrees as follows: Master of Science in Textile Chemistry, Master of Science in Textile Science, Doctor of Philosophy in Textile and Polymer Science, and in cooperation with the Chemistry Department, the Doctor of Philosophy in Chemistry with a major in Textile Chemistry.

Textile courses also may be taken as a minor area or as free electives. Recommended groups of courses may consist of 3, 6, 12, or 20 credits.
### BASIC FRESHMAN YEAR FOR TEXTILE CHEMISTRY AND TEXTILE SCIENCE PROGRAMS

#### First Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH 101</td>
<td>General Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 101</td>
<td>English Composition</td>
<td>3</td>
</tr>
<tr>
<td>MTHSC 106</td>
<td>Calc. of One Var.</td>
<td>4</td>
</tr>
<tr>
<td>TEXT 122</td>
<td>Introduction to Textiles</td>
<td>2</td>
</tr>
<tr>
<td>History Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td></td>
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<tr>
<td><strong>Total</strong></td>
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#### Second Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
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<tbody>
<tr>
<td>CH 112</td>
<td>General Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 102</td>
<td>English Composition</td>
<td>3</td>
</tr>
<tr>
<td>MTHSC 108</td>
<td>Calc. of One Var.</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 122</td>
<td>Phys. with Cal. I</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td></td>
<td><strong>2</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
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<td><strong>16</strong></td>
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</tbody>
</table>

1. Textile Science majors substitute CH 102.
2. To be selected from the following: HIST 101, 102, 172, 173.

### TEXTILE CHEMISTRY

#### SOPHOMORE YEAR

#### First Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>CH 223</td>
<td>Organic Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CH 225</td>
<td>Organic Chemistry Lab.</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 221</td>
<td>Phys. with Cal. II</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 223</td>
<td>Physics Lab. I</td>
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<tr>
<td>Literature Requirement</td>
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<td>Elective</td>
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#### Second Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>CH 224</td>
<td>Organic Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CH 226</td>
<td>Organic Chemistry Lab.</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 222</td>
<td>Phys. with Cal. III</td>
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<tr>
<td>Elective</td>
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#### JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Units</th>
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<tbody>
<tr>
<td>CH 331</td>
<td>Physical Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>ECON 200</td>
<td>Economic Concepts</td>
<td>3</td>
</tr>
<tr>
<td>TC 315</td>
<td>Introduction to Polymer Science and Engineering</td>
<td>3</td>
</tr>
<tr>
<td>TC 317</td>
<td>Polymer and Fiber Lab.</td>
<td>1</td>
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#### SENIOR YEAR

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC 457</td>
<td>Dyeing and Finishing I</td>
<td>3</td>
</tr>
<tr>
<td>TC 459</td>
<td>Dyeing and Fin. Lab.</td>
<td>1</td>
</tr>
<tr>
<td>TEXT 313</td>
<td>Fabric Formation</td>
<td>3</td>
</tr>
<tr>
<td>TEXT 321</td>
<td>Fiber Science</td>
<td>3</td>
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<td><strong>Total</strong></td>
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</table>

132 Total Semester Hours

1. To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2. Class advisers have lists of approved electives and will suggest sequences of courses.

### TEXTILE SCIENCE

#### SOPHOMORE YEAR

#### First Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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<tbody>
<tr>
<td>MTHSC 206</td>
<td>Calc. of Sev. Var.</td>
<td>4</td>
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<tr>
<td>PHYS 221</td>
<td>Phys. with Cal. II</td>
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</tr>
<tr>
<td>TC 303</td>
<td>Textile Chemistry</td>
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<tr>
<td>TC 305</td>
<td>Textile Chemistry Lab.</td>
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<td>Literature Requirement</td>
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#### Second Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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<tbody>
<tr>
<td>ECON 200</td>
<td>Economic Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MTHSC 208</td>
<td>Engineering Math. I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 222</td>
<td>Phys. with Cal. III</td>
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<tr>
<td>TC 304</td>
<td>Textile Chemistry</td>
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<tr>
<td>Elective</td>
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1. To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
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### JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Hours</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEXT 301 Fiber Processing I</td>
<td>3</td>
<td>2.2</td>
</tr>
<tr>
<td>TEXT 311 Fabric Development I</td>
<td>3</td>
<td>2.2</td>
</tr>
<tr>
<td>TEXT 321 Fiber Science</td>
<td>3</td>
<td>2.2</td>
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<tr>
<th>Course Description</th>
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<th>Notes</th>
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<tr>
<td>ENGL 314 Technical Writing</td>
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<tr>
<td>TEXT 302 Fiber Processing II</td>
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</tr>
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<td>TEXT 312 Fabric Development II</td>
<td>3</td>
<td>2.2</td>
</tr>
<tr>
<td>TEXT 322 Properties of Textile</td>
<td></td>
<td></td>
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<tr>
<td>Structure</td>
<td>3</td>
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### SENIOR YEAR

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<thead>
<tr>
<th>Course Description</th>
<th>Hours</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>TC 315 Introduction to Polymer</td>
<td>3</td>
<td>3.0</td>
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<tr>
<td>Science and Engineering</td>
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<tr>
<td>TC 317 Polymer and Fiber Lab.</td>
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<td>TEXT 403 Fiber Processing III</td>
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<td>TEXT 411 Fabric Development III</td>
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</table>

132 Total Semester Hours

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2 Advisers have lists of approved electives and will suggest sequences of courses.

### TEXTILE TECHNOLOGY

#### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 101 English Composition</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>TEXT 122 Introduction to Textiles</td>
<td>SOC 201 Sociological Perspective</td>
</tr>
<tr>
<td>Basic Science</td>
<td>Basic Science</td>
</tr>
<tr>
<td>History Elective$^2$</td>
<td>Elective$^2$</td>
</tr>
<tr>
<td>Elective$^2$</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
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#### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>ENGL 101 English Composition</th>
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<tbody>
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<td>SOC 201 Sociological Perspective</td>
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<tr>
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#### JUNIOR YEAR

<table>
<thead>
<tr>
<th>ENGL 101 English Composition</th>
<th>ENGL 102 English Composition</th>
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</thead>
<tbody>
<tr>
<td>TEXT 122 Introduction to Textiles</td>
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<td>Elective$^2$</td>
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<td><strong>Total</strong></td>
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#### SENIOR YEAR

<table>
<thead>
<tr>
<th>ENGL 101 English Composition</th>
<th>ENGL 102 English Composition</th>
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<tbody>
<tr>
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<td>SOC 201 Sociological Perspective</td>
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<td>Basic Science</td>
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<tr>
<td>History Elective$^2$</td>
<td>Elective$^2$</td>
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<td>Elective$^2$</td>
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</table>

128 Total Semester Hours

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2 To be selected from the following: HIST 101, 102, 172, 173.
3 Advisers have lists of approved electives and will suggest sequences of courses.
COLLEGE OF LIBERAL ARTS

The College of Liberal Arts, in addition to its six major curricula leading to the degree of Bachelor of Arts, makes indispensable contributions to the programs of all other divisions of the University, including nearly all the instruction in the humanities and the social sciences.

Single or double major concentrations may be elected in English, History, Modern Languages, Political Science, Psychology, and Sociology; minor concentrations are offered in these disciplines, in Communications, Computer Science, Dramatic Arts, Music, Philosophy, Spanish-American Area Studies, and Speech. In cooperation with other colleges of the University minor concentrations are also available in Accounting, Biology, Chemistry, Economics, Fine Arts, Geology, Mathematical Sciences, and Physics. Supporting work is offered in interdisciplinary humanistic studies. A student who elects a double major concentration will not be required to complete a minor concentration.

The College of Liberal Arts offers programs leading to graduate degrees in English and History.

BACHELOR OF ARTS CURRICULUM

The curriculum leading to the degree of Bachelor of Arts is designed to meet the needs of students who desire a broad general education, with emphasis upon the humanities and the social sciences, as a preparation for intelligent citizenship, for general commercial and industrial life, for government service, and for teaching. This curriculum also provides excellent background for the study of law, journalism, or medicine.

As soon as feasible in his college career, and not later than the end of the sophomore year, the student seeking the Bachelor of Arts degree will select a major and a minor field of concentration from the following areas (or a double major from the list of possible majors):

<table>
<thead>
<tr>
<th>Majors</th>
<th>Minors</th>
<th>Minors</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>Accounting</td>
<td>Mathematical Sciences</td>
</tr>
<tr>
<td>History</td>
<td>Biological Sciences</td>
<td>Sciences</td>
</tr>
<tr>
<td>Modern Languages</td>
<td>Chemistry</td>
<td>Modern Languages</td>
</tr>
<tr>
<td>Political Science</td>
<td>Cluster Minor</td>
<td>Music</td>
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<tr>
<td>Psychology</td>
<td>Communications</td>
<td>Philosophy</td>
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<td>Sociology</td>
<td>Computer Science</td>
<td>Physics</td>
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<td></td>
<td>Dramatic Arts</td>
<td>Political Science</td>
</tr>
<tr>
<td></td>
<td>Economics</td>
<td>Psychology</td>
</tr>
<tr>
<td></td>
<td>English</td>
<td>Sociology</td>
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<tr>
<td></td>
<td>Fine Arts</td>
<td>Spanish-American Area Studies</td>
</tr>
<tr>
<td></td>
<td>Geology</td>
<td>Speech</td>
</tr>
<tr>
<td></td>
<td>History</td>
<td></td>
</tr>
</tbody>
</table>
To fulfill requirements for a major concentration, a student takes 24 semester hours from courses above the sophomore level, including or in addition to certain courses specified by the major department; except as specified below, the minor concentration requires 15 credits from courses above the sophomore level, including certain specified courses. For a double major concentration, a student must fulfill all requirements for each major.

By arrangement between the Dean of the College of Liberal Arts and the dean of another college offering a Bachelor of Arts curriculum, a double major across college lines may be elected.

The total number of semester credits required for the degree is 130; of these, at least 12 credits must be earned in humanities courses numbered 300 or higher and at least 12 credits in social science courses numbered 300 or higher. The humanities are for this purpose considered to include art, English, languages, music, philosophy, and religion as well as courses entitled humanities; the social sciences are here considered to include economics, geography, history, political science, psychology, and sociology.

Students in the Bachelor of Arts program who expect to teach in the public schools may elect education courses required for teaching certificates by the South Carolina State Department of Education, such courses to be approved by their own departmental advisers.

### BASIC CURRICULUM

#### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 101 English Composition</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>HIST 172 Western Civilization</td>
<td>HIST 173 Western Civilization</td>
</tr>
<tr>
<td>Foreign Language</td>
<td>Foreign Language</td>
</tr>
<tr>
<td>Natural Science</td>
<td>Natural Science</td>
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<tr>
<td>Total</td>
<td>17</td>
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</table>

#### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Foreign Language</th>
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<tbody>
<tr>
<td>Literature Requirement</td>
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#### JUNIOR YEAR

<table>
<thead>
<tr>
<th>Major and Minor Areas</th>
<th>Major and Minor Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved Elective</td>
<td>Approved Elective</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
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</tbody>
</table>

#### SENIOR YEAR

<table>
<thead>
<tr>
<th>Major and Minor Areas</th>
<th>Major and Minor Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved Elective</td>
<td>Approved Elective</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
</tr>
</tbody>
</table>

130 Total Semester Hours

---

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

2 A two-semester sequence of the same natural science (astronomy, biology, chemistry, geology, physical science, or physics) totaling at least 8 semester credits, including the appropriate laboratory course.
MAJOR CURRICULA IN THE COLLEGE OF LIBERAL ARTS

ENGLISH

The program of study for a major concentration in English consists of courses stipulated in the basic curriculum\(^1\) for the Bachelor of Arts and 24 semester credits of English, arranged as follows:

<table>
<thead>
<tr>
<th>Group I</th>
<th>ENGL 405.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group II</td>
<td>Three credits from ENGL 406, 409, 410, 436, 443, 445, 446, 461.</td>
</tr>
<tr>
<td>Group III</td>
<td>Three credits from ENGL 425, 427, 431, 437, 462.</td>
</tr>
<tr>
<td>Group IV</td>
<td>Three credits from ENGL 422, 423, 424, 447.</td>
</tr>
<tr>
<td>Group V</td>
<td>Twelve additional credits above the sophomore level, including at least 6 credits from the 400 level.(^2)</td>
</tr>
</tbody>
</table>

Rising junior students with grade-point ratios of 3.3 or higher may, with the advice and consent of departmental advisers and the English Major Committee, propose different arrangements of the 24 upper-level English credits required. Candidates are expected to demonstrate the logic and thematic unity of their proposals. Continued approval will require that an overall grade-point ratio of 3.3 be maintained.

The Department requires certification of proficiency in composition for all of its majors. Proficiency may be demonstrated in any of the following ways:

1. By passing ENGL 101-102 with no grade lower than B; or, if placement credit is awarded for 101 and/or 102, by passing the required sophomore literature courses with no grade lower than B.
2. By passing ENGL 304. (If taken to satisfy the proficiency requirement, however, ENGL 304 may not be included in Group V above.)
3. In unusual circumstances, by special examination.

English majors must complete HIST 361, 363, and the third year of a foreign language or the second year of two foreign languages. Additional approved electives are added as necessary to meet the minimum number of 130 credits for graduation.

\(^1\) The Department recommends but does not insist that English majors take ENGL 203 and 204 to satisfy the sophomore literature requirement.

\(^2\) In no case may courses numbered lower than 300 be included in Group V; nor may any course be used toward satisfaction of both major and minor requirements.

HISTORY

The recommended program of study consists of the required courses in the Bachelor of Arts curriculum; completion of the third year of a foreign language; 30 additional credits in history, including at least two courses at the 400 level, selected with the advice and consent
of a departmental adviser and arranged to suit the academic interests of the student. Additional approved electives are added as needed to meet the minimum of 130 semester credits required for graduation.

MODERN LANGUAGES

A student may elect a major concentration in a single language, a double major in two languages, or a double major combining a language major with a major outside the department. All Modern Language majors will choose one of these options: Option A, designed to prepare the student to continue education in graduate school or to provide background for other professional language careers, requires the courses specified below plus 6 credits in history at the 300-400 level, selected with the approval of the Head of the Department of Languages. Option B, designed to prepare for teaching in secondary schools, requires the courses specified below plus coursework in education sufficient to meet certification requirements. Option C, designed to prepare for a career in business, requires at least a Cluster Minor concentration in Administration. All Modern Language majors must complete the stipulated courses in the basic Bachelor of Arts curriculum.

**French**  All options require FR 205 and 209 plus 24-semester credits in French at the 300-400 level appropriate to the option and approved by the head of the department.

**German**  All options require 24-semester credits in German at the 300-400 level appropriate to the option and approved by the head of the department.

**Spanish**  All options require SPAN 205 and 305 plus 24-semester credits in Spanish at the 300-400 level appropriate to the option and approved by the head of the department.

POLITICAL SCIENCE

For a major concentration in Political Science, the recommended program of study consists of the required courses in the Bachelor of Arts curriculum; POSC 101, 201, 341 and 21 semester hours of political science drawn from at least four of these fields:

5. Political Thought—POSC 351, 352, 453.

With the department head's approval, POSC 300 and 482 may be appropriately applied to one of the seven areas. Additional approved electives are added as needed to meet the minimum of 130 semester hours required for graduation.
PSYCHOLOGY

The recommended program of study for a major concentration in Psychology consists of the required courses in the Bachelor of Arts curriculum, PSYCH 201, 263, 265, 363, and 20 additional credits drawn from both 300- and 400-level psychology courses. ZOOL 470 may be included in lieu of one of the 300- or 400-level psychology courses. One of the following must be included: PSYCH 332, 341 and 344, or 451. Additional approved electives are added as needed to meet the minimum of 130 semester credits required for graduation.

SOCIOLOGY

The recommended program of study for a major concentration in Sociology consists of the required courses in the Bachelor of Arts curriculum, SOC 204, 206, 208, and 24 credits from one of these areas:

General Sociology   SOC 311 or 443, 324 or 341, 361 or 381, 391 or 393, 431 or 441, plus 9 credits selected from sociology and rural sociology courses numbered 300 or higher.

Social Services Sociology   SOC 302, 304, 495; 9 credits from SOC 309, 343, 393, 405, 431, 433, 451, 481, 490, 492; plus 6 credits from sociology and rural sociology courses numbered 300 or higher.

Criminal Justice Sociology   SOC 393, 495; 6 credits from POSC 435, SOC 305, 490; 6 credits from SOC 361, 391, 481, 492, 494; 6 credits from other sociology and rural sociology courses numbered 300 or higher.

MINOR CONCENTRATIONS

Students seeking the Bachelor of Arts degree may choose one of several minor concentrations available. The requirements for each area are detailed below.

Accounting A minor concentration in Accounting requires ACCT 201, 202, 301, 302, and 6 additional credits in accounting courses numbered higher than 201.

Biological Science A minor concentration in Biological Science requires 15 semester credits in the biological sciences numbered higher than 200.

Chemistry A minor concentration in Chemistry requires CH 101, 102, and 15 additional credits in chemistry, the courses to be selected in consultation with the Department of Chemistry.

Cluster Minor This minor concentration is designed to allow students a somewhat wider choice of course materials than is possible with the conventional subject-matter minor. The general requirement for the Cluster Minor is 15 semester credits in courses numbered higher than 300 (except where noted differently), chosen according
Degrees and Curricula

to one of the plans listed below. Courses within the student's major area may not be included in the Cluster Minor.

Group I  Social Sciences—economics, geography, history, political science, psychology, sociology.
Group II  Philosophy and Religion.
Group III  Administration—accounting, economics, finance, industrial management, law.
Group IV  Life Sciences—biochemistry, botany, genetics, microbiology, zoology.
Group V  Physical Sciences—chemistry, geology, physics.

Communications A minor concentration in communications requires 18 credits distributed as follows:

General Communications Option  ENGL 231, 304, and either 302 or 307; PHIL 202; 6 approved elective credits.

Advertising Option  AGEC 351; ENGL 231 or 304; INED 204; PSYCH 361; 6 approved elective credits.

Commerce Option  AGEC 351 or INED 496; ENGL 231 or 304, 302 or 307; IM 308; 6 approved elective credits.

Politics Option  ENGL 304 and either 302 or 307; POSC 341, 443; 6 approved elective credits.

Elective credits are approved by the Head of the Department of English or his representative.

Computer Science A minor in Computer Science requires CPSC 110 or 120; 130, 210, 230, and two additional computer science courses numbered 300 or higher.

Dramatic Arts The minor concentration in Dramatic Arts requires ENGL 310 and 15 additional semester credits arranged as follows:

Group I  Dramatic Literature—At least 3 credits from these courses: ENGL 405, 413, 416, 446.

Group II  Production—9 credits from the following, including at least one sequence: ENGL 308 and 485, 309 and 486, 320 and 487.

Group III  Elective—3 additional credits from courses listed above.

Economics A minor concentration in Economics requires ECON 314, 407, and 9 additional credits from economics courses numbered 300 or higher.

English A minor concentration in English requires 15 semester credits in English above the sophomore level, arranged as follows:

Group I  ENGL 405.


^No course in the 100 series is acceptable toward the Cluster Minor and not more than two courses in the 200 series.
Group III Three credits from ENGL 422, 423, 424, 447.

Group IV Six additional credits above the sophomore level, including at least 3 credits from the 400 level.

Department certification of proficiency in composition is required. (See discussion under major concentration in English.)

**Fine Arts** The minor concentration in Fine Arts requires HUM 201, 202, and 15 semester credits from the following courses, of which at least 9 must be earned in courses numbered 300 or higher, and no more than 9 in any discipline selected: Art and Architectural History (all courses); ENGL 305, 308, 309, 310, 311, 333, 334, 335, 450, 451; HUM 301, 305, 309; LS 190; MUS 151, 152, 205, 206, 210, 251, 252, 305, 306, 311, 315, 316, 362, 365, 421, 422; Visual Arts (all courses).

**Geology** A minor concentration in Geology requires 15 semester credits from the following courses: GEOL 101, 102, 306, 309, 402, 403, 404, 411, 412.

**History** A minor concentration in History requires HIST 101, 102, and 15 additional credits drawn from 300- and 400-level history courses. At least one 400-level course must be included.

**Mathematical Sciences** A minor concentration in Mathematical Sciences requires MTHSC 106, 108, 206, and 9 additional credits in mathematical sciences, including at least two of these courses: CPSC 110, MTHSC 208, 301; and one 400-level course in mathematical sciences or computer science.

**Modern Languages** A minor concentration in Modern Languages requires FR 205 or SPAN 205 plus 15 semester credits in one modern language from courses on the 300- and 400-levels, including at least one course on the 400 level.

**Music** A minor concentration in Music requires MUS 151, 152, 205, 206, two credits in ensemble (MUS 361, 362, or 365), and 11 additional credits from these courses: MUS 210, 251, 252, 305, 306, 311, 315, 316, 421, 422. Two additional ensemble credits may be included.

**Philosophy** A minor concentration in Philosophy requires 6 credits from PHIL 201, 202, 203, and 15 semester credits from the following courses: PHIL 303, 304, 312, 318, 325, 344.

**Physics** A minor concentration in Physics requires PHYS 122 and 15 additional semester credits in physics, including PHYS 221, 222.

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1 Students transferring from the College of Architecture may substitute CADS 151-152 for HUM 201-202.
Political Science A minor concentration in Political Science requires POSC 101, 201, and 15 additional semester credits selected from at least three of the fields of political science. At least one 400-level course must be included.

Psychology A minor concentration in Psychology requires PSYCH 201, 263, 265, and 15 semester credits from 300- and 400-level psychology courses. At least one 400-level course must be included. Sociology majors may be excused from PSYCH 263 and 265.

Sociology A minor concentration in Sociology requires SOC 201 or 204 and 15 credits from sociology and rural sociology courses numbered 300 or higher. At least one 400-level course must be included.

Spanish-American Area Studies A minor concentration in Spanish-American Area Studies requires the equivalent of SPAN 202, plus 15 semester credits distributed as follows: 6 credits from HIST 340, 341, 342, 440; 6 credits from SPAN 305, 306, 308, 311; 3 credits from AGRIC 301, 401, ECON 410, POSC 475.

Speech A minor concentration in Speech requires ENGL 360 and 12 additional semester credits arranged as follows:

Group I  Performance—3 to 6 credits from ENGL 301, 303, 305.

Group II Theory—3 to 6 credits from ENGL 302, 307, 313.

Group III Elective—At least 3 additional credits from ENGL 232, 306, 362, 363, or any of the courses listed above not used to fill the minor requirement.

APPROVED ELECTIVES FOR STUDENTS IN THE COLLEGE OF LIBERAL ARTS

Class advisers in the College of Liberal Arts will normally approve the following courses as electives, but the Dean of the College of Liberal Arts retains the prerogative of limiting the total number of credits that may be approved in a discipline or area. Accounting (all courses); Aerospace Studies and Military Science (combined maximum of 10 credits); Agricultural Economics 352; Art and Architectural History (limit of 12 credits); Ceramic Arts 101, 102; Interdisciplinary Studies 251; Economics (all courses); Education (courses required for certification in South Carolina; other courses by special arrangement); Engineering 220; Experimental Statistics 301, 462; Industrial Education 204, 440; Industrial Management 299, 301, 307, 405; Law 312, 313, 322; Management Science 311, 413, 414; Rural Sociology 301; Textile Science 333; and Visual Arts (limit of 9 credits).

All courses offered in the College of Liberal Arts and the College of Sciences may be taken as electives except: ENGL 100, 111, MTHSC 100, 115, 116, 215, 216, PHYS 460.
COLLEGE OF NURSING

The College of Nursing offers a Baccalaureate and an Associate degree program in Nursing. These programs are accredited by the State Board of Nursing of South Carolina and the National League for Nursing. A graduate program leading to the Master of Science in Nursing degree was established in 1974. Application for national accreditation for this program will be made as soon as appropriate. Men and women are admitted to all programs.

The program leading to the Bachelor of Science in Nursing degree is designed to prepare students for the practice of professional nursing in a variety of settings—hospitals, industry, clinics, and public health agencies. The program offers the foundation for graduate study in nursing and an unlimited opportunity for men and women for sound career development in professional nursing. The baccalaureate program is four academic years in length. The student is enrolled in liberal arts and basic science courses during the first two years. These courses are arranged sequentially in order to provide the foundation for professional courses which are planned for the junior and senior years. In addition, advanced liberal arts courses are taken during the junior and senior years. Clinical nursing experiences under the guidance of the College of Nursing faculty will take place with patients in the Greenville Hospital System, Easley Baptist Hospital, Oakmont Nursing Center, Lila Doyle Annex—Oconee-Memorial Hospital; Anderson County Head-Start Center; Anderson Memorial Hospital Child Development Center; Clemson Day Care Center; Appalachian Health Department, Districts I and II; and with local public health agencies.

The program leading to the Associate in Arts in Nursing degree is designed to prepare the student at the technical level of nursing for direct patient-centered nursing under supervision in hospitals and other institutional health centers. The Associate degree program may be completed in two academic years. This technical background is balanced by courses in the biological and social sciences and the humanities. Clinical learning experiences planned as an integral part of the program, under the guidance of the College of Nursing faculty, take place with patients in the Anderson Memorial Hospital, Oconee Memorial Hospital and Lila Doyle Annex. In addition, learning experiences are planned at the Appalachia Health District I, Anderson-Oconee-Pickens Mental Health Center, Anderson Memorial Hospital Child Development Center, and physicians' offices.

Students enrolled in the College of Nursing must meet the course requirements in the sequence as described for each program in order to qualify for the degree and for licensure to practice nursing. All students enrolled in the College of Nursing are required to achieve a grade of C in each nursing course attempted and demonstrate satisfactory performance in the clinical laboratory to be eligible for the succeeding nursing courses.
# BACHELOR OF SCIENCE IN NURSING

## FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>BIOL 103 General Biology 1</td>
<td>BIOL 104 General Biology II</td>
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<tr>
<td>BIOL 106 General Biology Lab. 1</td>
<td>BIOL 106 Gen. Biology Lab. II</td>
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<td>CH 101 General Chemistry</td>
<td>CH 102 General Chemistry</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>ENGL 102 English Composition</td>
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<tr>
<td>MTHSC 102 Intro. to Math. Anal.</td>
<td>MTHSC 101 Finite Probability</td>
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<td>NURS 100 Orientation</td>
<td>History Elective</td>
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## SOPHOMORE YEAR

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>MICRO 305 General Microbiology</td>
<td>NURS 207 Dynamics of Human</td>
</tr>
<tr>
<td>PSYCH 201 General Psychology</td>
<td>Relations</td>
</tr>
<tr>
<td>ZOOL 222 Human Anatomy</td>
<td>NURS 209 Nursing Skills Lab.</td>
</tr>
<tr>
<td>Literature Requirement</td>
<td>PSYCH 321 Develop. Psychology</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>Total</strong></td>
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<tr>
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</table>

## JUNIOR YEAR

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>NURS 309 Human Values in Nurs.</td>
<td>NURS 310 Perspectives in Nursing</td>
</tr>
<tr>
<td>NURS 311 Nursing During Alterations in Life Patterns</td>
<td>NURS 312 Nursing of Acute and Chronically Distressed</td>
</tr>
<tr>
<td>NURS 313 Promotion of Health</td>
<td>NURS 314 Nursing in the Home</td>
</tr>
<tr>
<td>NUTR 451 Human Nutrition</td>
<td>SOC 311 The Family</td>
</tr>
<tr>
<td>SOC 202 Social Problems</td>
<td>Elective</td>
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## SENIOR YEAR

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<table>
<thead>
<tr>
<th></th>
<th></th>
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<tbody>
<tr>
<td>NURS 413 Complex Nursing</td>
<td>NURS 414 Complex Nursing</td>
</tr>
<tr>
<td>Intervention I</td>
<td>Intervention II</td>
</tr>
<tr>
<td>NURS 419 Multiproblem Family</td>
<td>NURS 422 Cur. Research in Nurs.</td>
</tr>
<tr>
<td>NURS 421 Hist. and Phil. of Nurs.</td>
<td>PSYCH 302 Social Psychology</td>
</tr>
<tr>
<td>Elective</td>
<td>Nursing Elective</td>
</tr>
<tr>
<td>Elective</td>
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<td><strong>Total</strong></td>
</tr>
<tr>
<td>16</td>
<td>17</td>
</tr>
</tbody>
</table>

134 Total Semester Hours

1. To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2. BIOL 110 and 111 may be taken in lieu of BIOL 103, 104, 105, 106. (See Course Description section.)
3. SOC 309 may be taken in lieu of SOC 311.
4. Electives to be selected from the following: Humanities, literature, music, philosophy, religion; courses must be numbered 201 and above.
5. Select free electives from courses numbered 201 and above.
6. Select from the following: NURS 426, 431, 432, 434, 435, 437, 438, 439, 440, 441.

Notes:

1. NURS 207 and 209 are open to students enrolled in the Baccalaureate program only. These courses are offered first summer session for incoming special students with permission of the Dean of the College of Nursing.
2. A minimum grade of C in each nursing course is required. Students may repeat a nursing course one time only.
3. The physical, biological, and social sciences and mathematics courses scheduled for the freshman and sophomore years are prerequisite to nursing courses numbered 300 and above. A grade of C or above is required in each biological science course (BIOC 210, MICRO 305, ZOOL 222, 223) scheduled for the sophomore year as described in the curriculum plan of the Baccalaureate degree program.
4. A minimum grade-point ratio of 2.0 is required for registration in nursing courses numbered 300 and above.
5. Students enrolled in ROTC may substitute 10 semester hours of military science or aerospace studies for 6 semester hours of free electives and 4 semester hours of nursing electives.
ASSOCIATE IN ARTS IN NURSING

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 101 English Composition</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>NURS 103 Nursing I</td>
<td>NURS 104 Nursing II</td>
</tr>
<tr>
<td>PSYCH 201 General Psychology</td>
<td>PSYCH 321 Developmental Psych</td>
</tr>
<tr>
<td>ZOOL 110 Integrated Science I</td>
<td>ZOOL 111 Integrated Science II</td>
</tr>
<tr>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

SECOND YEAR

| NURS 205 Nursing III | NURS 204 Trends in Nursing |
| SOC 201 Sociological Perspective | NURS 206 Nursing IV |
| Elective | SOC 433 Sociology of Aging |
| 16 | 17 |

65 Total Semester Hours

1 Consult catalog or adviser for electives.

Notes:
1. A minimum grade of C is required for NURS 103-206 for continuance in the Associate in Arts Nursing program.
2. Students are allowed to repeat a nursing course one time only.
3. A grade of C or above is required in ZOOL 110 and 111.
COLLEGE OF SCIENCES

The College of Sciences, attuned to the times and its needs, offers nine major curricula leading to the degree of Bachelor of Science. These are Biochemistry, Botany, Chemistry, Geology, Mathematical Sciences, Medical Technology, Microbiology, Physics, and Zoology.

In addition, the Bachelor of Arts degree is offered with a major emphasis in either Chemistry, Geology, Mathematical Sciences, or Physics.

Not only are the departments in the College of Sciences concerned with their own programs, but they work closely with the other academic departments in the University. This interweaving of the physical, mathematical and biological sciences with other disciplines, such as economics, engineering, management and others allows a student great flexibility and responsibility in designing his own program.

BACHELOR OF ARTS CURRICULA

The curricula leading to the Bachelor of Arts degree are designed to meet the needs of those students who desire a broad general education. The first two years are spent in introductory work in several areas in order to give the student breadth of view. This background enables the student to select intelligently his major and minor fields of concentration. The major areas in the College of Sciences are Chemistry, Geology, Mathematical Sciences, and Physics.

A student has a large degree of flexibility and responsibility in designing the minor area from many departments in the University. All minors listed and described on page 127 under the College of Liberal Arts are approved for this program as well as any of the natural sciences and mathematical sciences. The courses for these minors are to be selected in consultation with the appropriate department. The minor fields are as follows:

Accounting       English       Philosophy
Biochemistry     Fine Arts     Physics
Botany           Geology       Political Science
Chemistry        History       Psychology
Cluster Minor    Mathematical  Sociology
Communications   Sciences      Spanish-American
Computer Science Microbiology  Area Studies
Dramatic Arts    Modern Languages Speech
Economics        Music         Zoology

To fulfill requirements for a major concentration, a student takes 24 semester hours credit from courses above the sophomore level.

Note: No curriculum in the College of Sciences leading to the Bachelor of Arts degree will allow credit for ENGL 100, MTHSC 100, 104, or 105 to be used to satisfy requirements for graduation.
including or in addition to certain courses specified by the major department; the minor concentration requires 15 credits from courses above the sophomore level. In some major and minor disciplines, certain prescribed courses at the sophomore level are counted toward the 24 and 15 credit-hour requirements.

MAJOR FIELDS OF CONCENTRATION

BASIC FRESHMAN YEAR FOR CHEMISTRY AND GEOLOGY PROGRAMS

For the Bachelor of Arts degree, Chemistry requires 130 semester hours, and Geology requires 128 semester hours.

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH 101 General Chemistry .......... 4 (3,3)</td>
<td>CH 112 General Chemistry(^1) .......... 4 (3,3)</td>
</tr>
<tr>
<td>ENGL 101 English Composition .......... 3 (3.0)</td>
<td>ENGL 102 English Composition .......... 3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 106 Cal. of One Var. I .......... 4 (4.0)</td>
<td>MTHSC 108 Cal. of One Var. II .......... 4 (4.0)</td>
</tr>
<tr>
<td>Modern Language ..................... 4 (3.1)</td>
<td>Modern Language ..................... 4 (3.1)</td>
</tr>
<tr>
<td><strong>15</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

\(^1\)Geology majors may substitute CH 102.

CHEMISTRY

SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH 223 Organic Chemistry(^2) .......... 3 (3.0)</td>
<td>CH 224 Organic Chemistry(^2) .......... 3 (3.0)</td>
</tr>
<tr>
<td>CH 227 Organic Chemistry Lab .......... 1 (0.3)</td>
<td>CH 228 Organic Chemistry Lab .......... 1 (0.3)</td>
</tr>
<tr>
<td>MTHSC 206 Cal. of Sev. Var .......... 4 (4.0)</td>
<td>HIST 172 Western Civilization .......... 3 (3.0)</td>
</tr>
<tr>
<td>PHYS 122 Phys. with Cal. I .......... 3 (2.2)</td>
<td>PHYS 221 Phys. with Cal. II .......... 3 (2.2)</td>
</tr>
<tr>
<td>Literature Requirement(^1) .......... 3 (3.0)</td>
<td>Literature Requirement(^1) .......... 3 (3.0)</td>
</tr>
<tr>
<td>Modern Language ..................... 3 (3.0)</td>
<td>Modern Language ..................... 3 (3.0)</td>
</tr>
<tr>
<td><strong>17</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

JUNIOR YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 173 Western Civilization .......... 3 (3.0)</td>
<td>Chemistry Elective .......... 4</td>
</tr>
<tr>
<td>Chemistry Elective .......... 4</td>
<td>Minor .......... 6</td>
</tr>
<tr>
<td>Minor .......... 3</td>
<td>Elective .......... 6</td>
</tr>
<tr>
<td>Elective .......... 7</td>
<td><strong>16</strong></td>
</tr>
<tr>
<td><strong>17</strong></td>
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SENIOR YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry Elective .......... 4</td>
<td>Chemistry Elective .......... 4</td>
</tr>
<tr>
<td>Minor .......... 3</td>
<td>Minor .......... 3</td>
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<tr>
<td>Elective .......... 10</td>
<td>Elective .......... 10</td>
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<td><strong>17</strong></td>
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</tbody>
</table>

130 Total Semester Hours

\(^1\)To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

\(^2\)CH 223, 224 will count towards the 24 hours of the Chemistry major.
### GEOLOGY
See page 139 for Freshman year.

**SOPHOMORE YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOL 101 Physical Geology</td>
<td>GEOL 102 Historical Geology</td>
</tr>
<tr>
<td>MTHSC 206 Cal. of Sev. Var.</td>
<td>HIST 172 Western Civilization</td>
</tr>
<tr>
<td>Modern Language</td>
<td>Modern Language</td>
</tr>
<tr>
<td>Literature Requirement</td>
<td>Elective</td>
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<tr>
<td>Elective</td>
<td>Elective</td>
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**JUNIOR YEAR**

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>GEOL 306 Mineralogy</td>
<td>GEOL 309 Petrology</td>
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<tr>
<td>HIST 173 Western Civilization</td>
<td>Geology Elective</td>
</tr>
<tr>
<td>Geology Elective</td>
<td>Humanities Elective</td>
</tr>
<tr>
<td>Humanities Elective</td>
<td>Minor</td>
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<td>Minor</td>
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<td>Elective</td>
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**SENIOR YEAR**

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<table>
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<tr>
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<tbody>
<tr>
<td>GEOL 402 Structural Geology</td>
<td>GEOL 404 Economic Geology</td>
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<td>Geology Elective</td>
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<tr>
<td>Minor</td>
<td>Minor</td>
</tr>
<tr>
<td>Social Science Elective</td>
<td>Social Science Elective</td>
</tr>
<tr>
<td>Elective</td>
<td>Elective</td>
</tr>
<tr>
<td></td>
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</table>

128 Total Semester Hours

1To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

### MATHEMATICAL SCIENCES

For a major concentration a recommended program of study is shown below, with 130 semester hours required for graduation.

**FRESHMAN YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPSC 110 Elem. Comp. Prog.</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>HIST 172 Western Civilization</td>
</tr>
<tr>
<td>MTHSC 106 Cal. of One Var. I</td>
<td>MTHSC 108 Cal. of One Var. II</td>
</tr>
<tr>
<td>MTHSC 150 Intro. to Math. Sci.</td>
<td>Modern Language</td>
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<tr>
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<td>Elective</td>
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**SOPHOMORE YEAR**

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<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>HIST 173 Western Civilization</td>
<td>ECON 200 Economic Concepts</td>
</tr>
<tr>
<td>MTHSC 206 Cal. of Sev. Var.</td>
<td>MTHSC 208 Engineering Math. I</td>
</tr>
<tr>
<td>MTHSC 301 Statistical Theory and</td>
<td>MTHSC 411 Linear Algebra</td>
</tr>
<tr>
<td>Methods I</td>
<td>Literature Requirement</td>
</tr>
<tr>
<td>Literature Requirement</td>
<td>Elective</td>
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<tr>
<td>Modern Language</td>
<td>Elective</td>
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**JUNIOR YEAR**

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>MTHSC 350 Intro. to Math. Models</td>
<td>CAAH 303 Evol. of Vis. Arts I</td>
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<tr>
<td>Minor</td>
<td>or MUS 210 Music Appreciation</td>
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<tr>
<td>Natural Science Elective</td>
<td>Mathematical Sciences Elective</td>
</tr>
<tr>
<td>Social Science Elective</td>
<td>Minor</td>
</tr>
<tr>
<td>Social Science Elective</td>
<td>Natural Science Elective</td>
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<tr>
<td>Elective</td>
<td>Social Science Elective</td>
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### SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MTHSC 412 Intro. to Mod. Algebra or MTHSC 419 Discrete Math. Structures I</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 453 Adv. Calculus I or MTHSC 463 Math. Analysis I</td>
<td>3 (3.0)</td>
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<tr>
<td>Minor</td>
<td>6</td>
</tr>
<tr>
<td>Elective</td>
<td>4</td>
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<tr>
<td></td>
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</tr>
</tbody>
</table>

130 Total Semester Hours

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Note: If students choose General Science, they must also take Modern Humanities.

1To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

2Electives must be approved by adviser.

### PHYSICS

For a major concentration a recommended program of study is shown below, with 128 semester hours required for graduation. The BA in Physics program is ideal for students interested in acquiring a broad-based liberal education that includes a strong and solid understanding of science.

#### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CH 101 General Chemistry</td>
<td>4 (3.3)</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>HIST 172 Western Civilization</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 106 Calc. of One Var. I</td>
<td>4 (4.0)</td>
</tr>
<tr>
<td>PHYS 101 Current Topics in Modern Physics</td>
<td>1 (0.2)</td>
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</table>

<table>
<thead>
<tr>
<th>Second Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH 112 General Chemistry</td>
<td>4 (3.3)</td>
</tr>
<tr>
<td>ENGL 102 English Composition</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>HIST 173 Western Civilization</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 108 Calc. of One Var. II</td>
<td>4 (4.0)</td>
</tr>
<tr>
<td>PHYS 122 Phys. with Cal. I</td>
<td>3 (2.2)</td>
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#### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
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</thead>
<tbody>
<tr>
<td>MTHSC 206 Calculus of Sev. Var.</td>
<td>4 (4.0)</td>
</tr>
<tr>
<td>PHYS 221 Physics with Cal. II</td>
<td>3 (2.2)</td>
</tr>
<tr>
<td>PHYS 223 Physics Lab. I</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>Literature Requirement</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Modern Language</td>
<td>4 (3.1)</td>
</tr>
<tr>
<td>Elective</td>
<td>1</td>
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<td></td>
<td>16</td>
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</table>

<table>
<thead>
<tr>
<th>Second Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTHSC 208 Engineering Math. I</td>
<td>4 (4.0)</td>
</tr>
<tr>
<td>PHYS 222 Physics with Cal. III</td>
<td>3 (2.2)</td>
</tr>
<tr>
<td>PHYS 224 Physics Lab. II</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>Literature Requirement</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Modern Language</td>
<td>3 (3.1)</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
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<td></td>
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#### JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 321 Mechanics I</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Humanities</td>
<td>3</td>
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<tr>
<td>Minor</td>
<td>3</td>
</tr>
<tr>
<td>Modern Language</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
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<td></td>
<td>15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 322 Mechanics II</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>PHYS 340 Elec. and Magnetism I</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Humanities</td>
<td>3</td>
</tr>
<tr>
<td>Minor</td>
<td>3</td>
</tr>
<tr>
<td>Modern Language</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

#### SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PHYS 455 Quantum Physics I</td>
<td>3 (3.0)</td>
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<tr>
<td>Minor</td>
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<tr>
<td>Physics Elective</td>
<td>4</td>
</tr>
<tr>
<td>Social Science Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

128 Total Semester Hours

---

1To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

Note: For a major or minor concentration in Physics, PHYS 221 and 222 will count.
BACHELOR OF SCIENCE CURRICULA

BIOCHEMISTRY

Biochemistry is the study of the molecular basis of life. In order to comprehend the current biochemical information and to make future contributions to our molecular understanding of life processes, the student must obtain a broad background in biology and a firm foundation in chemistry, mathematics, and physics; the biochemistry curriculum is built upon this concept.

The program provides an excellent educational background for professional school (e.g., medicine, dentistry, or veterinary medicine) and graduate school in biochemistry or another biological science discipline.

The graduate will find employment opportunities in the research and service programs of universities, medical schools, hospitals, research institutes, and industrial and government laboratories.

<table>
<thead>
<tr>
<th>FRESHMAN YEAR</th>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110 Prin. of Biology I</td>
<td>5 (4,3)</td>
<td>BIOL 111 Prin. of Biology II</td>
</tr>
<tr>
<td>CH 101 General Chemistry</td>
<td>4 (3,3)</td>
<td>CH 112 General Chemistry</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>3 (3,0)</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>MTHSC 106 Cal. of One Var. I</td>
<td>4 (4,0)</td>
<td>MTHSC 108 Cal. of One Var. II</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16</strong></td>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

| SOPHOMORE YEAR | | |
|----------------|----------------|
| CH 223 Organic Chemistry | 3 (3,0) | CH 224 Organic Chemistry | 3 (3,0) |
| CH 227 Organic Chemistry Lab | 1 (0,3) | CH 228 Organic Chemistry Lab | 1 (0,3) |
| MTHSC 206 Calculus of Sev. Var. | 4 (4,0) | PHYS 223 Physics Lab. I | 1 (0,3) |
| PHYS 122 Phys. with Cal. I | 3 (2,2) | Literature Requirement^1 | 3 (3,0) |
| Literature Requirement^1 | 3 (3,0) | Approved Elective^2 | 3 |
| Approved Elective^2 | | **Total** | **17** |

| JUNIOR YEAR | | |
|--------------|----------------|
| CH 313 Quantitative Analysis | 3 (3,0) | CH 332 Physical Chemistry | 3 (3,0) |
| CH 317 Quantitative Anal. Lab. | 1 (0,3) | CH 340 Physical Chemistry Lab | 1 (0,3) |
| CH 331 Physical Chemistry | 3 (3,0) | MICRO 305 General Microbiology | 4 (3,3) |
| CH 339 Physical Chemistry Lab | 1 (0,3) | Approved Elective^2 | 6 |
| PHYS 222 Phys. with Cal. III | 3 (2,2) | Science Elective^3 | 3 |
| Science Elective^3 | 3 | **Total** | **17** |
| Approved Elective^2 | 3 | | |
| **Total** | **17** | | |

^Note: No curriculum in the College of Sciences leading to the Bachelor of Science degree will allow credit for ENGL 100, MTHSC 100, 104, or 105 to be used to satisfy the requirements for graduation.
SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOCH 422 Phys. Approach to Bioch</td>
<td>3 (3.0)</td>
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<tr>
<td>BIOCH 425 Gen. Biochemistry Lab.</td>
<td>1 (0.3)</td>
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<tr>
<td>BIOCH 491 Spec. Prob. in Bioch</td>
<td>3 (0.9)</td>
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<tr>
<td>or Science Elective(^1)</td>
<td>4</td>
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<tr>
<td>ENGL 301 Public Speaking</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Approved Elective(^2)</td>
<td>6</td>
</tr>
</tbody>
</table>

16-17

134 Total Semester Hours

\(^1\) To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

\(^2\) At least 18 hours must be elected from the humanities and or social sciences. A one-year sequence from the following is strongly recommended: GER 101, 102; FR 101, 102; RUSS 101, 102.

\(^3\) An approved elective to be selected from botany, chemistry, computer science, genetics, mathematical sciences, microbiology, physics, plant pathology, or zoology. At least one semester of BIOCH 491 is required.

BOTANY

Botany is a diversified subject area that seeks to explain the many aspects of plant life—as it is today, as it was yesterday, and as it will be tomorrow. Areas explored by botanists range from highly theoretical experimentation to direct utilization of knowledge in order to solve problems such as the enhancement of food supplies, maintenance and improvement of human health, and conservation of nature’s beauty. Studies in botany extend from consideration of minute molecular and subcellular activities to descriptions of structure, function, and action of whole plants and to evaluations of how plants are associated with the operation of the entire planet.

Because of the breadth of the subject, a variety of different expectations and interests may be found among students majoring in Botany. For this reason, the Botany curriculum consists of three options which provide appropriate avenues for students seeking different types of careers in plant biology. Options fall into two programs: (1) Pregraduate School program which meets the needs of students wishing to pursue advanced degrees, and (2) Prevocational program for students planning to begin career vocations immediately upon completion of the bachelor’s degree.

BOTANY—PREGRADUATE SCHOOL MOLECULAR AND ORGANISMAL OPTIONS

The Pregraduate School program provides two options: (1) Organismal option which emphasizes the biology of plants and prepares students for graduate study in the descriptive or empirical aspects of botany; and (2) Molecular option which stresses experiences in physical and mathematical sciences, in addition to a core of botanical courses, and prepares students to undertake graduate study in molecular and physiological botany.
### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110 Prin. of Biology I</td>
<td>BIOL 111 Prin. of Biology II</td>
</tr>
<tr>
<td>CH 101 General Chemistry</td>
<td>CH 112 General Chemistry</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>MTHSC 106 Cal. of One Var I</td>
<td>Math. Sciences Requirement</td>
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<tr>
<td>Elective</td>
<td>Elective</td>
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### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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</thead>
<tbody>
<tr>
<td>BOT 201 Field Botany</td>
<td>BIOCH 301 Molec. Biology</td>
</tr>
<tr>
<td>CH 227 Organic Chemistry Lab</td>
<td>BOT 202 Survey Plant Kingdom</td>
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<tr>
<td>ZOOL 201 Invertebrate Zoology</td>
<td>CH 224 Organic Chemistry</td>
</tr>
<tr>
<td>or ZOOL 202 Vertebrate Zoology</td>
<td>Elective</td>
</tr>
<tr>
<td>Math. Sciences Requirement</td>
<td>Elective</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
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<td>16</td>
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<td>17-18</td>
</tr>
</tbody>
</table>

1 See Molecular or Organismal Option.

2 Mathematical Sciences Requirement. For Molecular Option MTHSC 108 and one of the following: CPSC 110, MTHSC 206, 301. For Organismal Option two of the following: CPSC 110, MTHSC 108, 301, 405.

### BOTANY—PREGRADUATE SCHOOL MOLECULAR OPTION

#### JUNIOR YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>BOT 331 Intro. Plant Taxonomy</td>
<td>BOT 421 Plant Physiology</td>
</tr>
<tr>
<td>BOT 451 Plant Anatomy</td>
<td>MICRO 305 General Microbiology</td>
</tr>
<tr>
<td>GEN 305 Intro. and Molec. Gen.</td>
<td>PHYS 221 Phys. with Cal. II</td>
</tr>
<tr>
<td>PHYS 122 Phys. with Cal. I</td>
<td>PHYS 223 Physics Lab. I</td>
</tr>
<tr>
<td>Elective</td>
<td>Elective</td>
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<tr>
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#### SENIOR YEAR

<table>
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<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>BIOCH 423 Prin. of Biochemistry</td>
<td>BIOCH 424 Prin. of Biochemistry</td>
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<tr>
<td>BOT 441 Plant Ecology</td>
<td>Botany Elective</td>
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<td>PHYS 222 Phys. with Cal. III</td>
<td>Elective</td>
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<td>PHYS 224 Physics Lab. II</td>
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<td>Elective</td>
<td>3</td>
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</table>

1 Electives: A minimum of six hours from two subject areas of social sciences (geography, economics, political science, psychology, sociology); a minimum of nine hours from at least two subject areas of the humanities (literature and English, modern languages, humanities, art, music, philosophy, religion); a minimum of eight hours from courses related to the option and approved by the student's adviser.

### BOTANY—PREGRADUATE SCHOOL ORGANISMAL OPTION

#### JUNIOR YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOT 331 Intro. Plant Taxonomy</td>
<td>BOT 421 Plant Physiology</td>
</tr>
<tr>
<td>BOT 451 Plant Anatomy</td>
<td>MICRO 305 General Microbiology</td>
</tr>
<tr>
<td>GEN 305 Intro. and Molec. Gen.</td>
<td>PHYS 208 General Physics II</td>
</tr>
<tr>
<td>PHYS 207 General Physics I</td>
<td>Elective</td>
</tr>
<tr>
<td>Elective</td>
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#### SENIOR YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>BIOCH 423 Prin. of Biochemistry</td>
<td>BIOCH 424 Prin. of Biochemistry</td>
</tr>
<tr>
<td>BOT 441 Plant Ecology</td>
<td>Botany Elective</td>
</tr>
<tr>
<td>PHYS 222 Phys. with Cal. III</td>
<td>Elective</td>
</tr>
<tr>
<td>PHYS 224 Physics Lab. II</td>
<td>Elective</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
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132-134 Total Semester Hours
SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
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<tbody>
<tr>
<td>BOT 441 Plant Ecology</td>
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<td>Botany Elective</td>
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<td>Elective^</td>
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<td></td>
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</table>

1 Electives: A minimum of nine hours from at least two subject areas of the social sciences; a minimum of twelve hours from at least two subject areas of the humanities; a minimum of ten hours from courses related to the option and approved by the student's adviser.

BOTANY—PREVOCATIONAL

The Prevocational program is structured to furnish some employment advantages upon graduation. The core of the program provides a foundation in botany, a solid introduction to other sciences and liberal arts; and just as important, it provides a flexibility through free electives that allows students to develop in peripheral areas of interest or areas necessary for specialized employment. Among the courses appropriate for electives are those from areas of applied plant sciences, business, recreation, forestry, environment, and those in education. Students completing the Prevocational program should find employment opportunities as teachers, in the many facets of research, production, and sales and services connected with agriculture and other plant-oriented industries. In addition, persons knowledgeable of plants and plant biology may find job opportunities with one of the many private or governmental agencies associated with environmental health, monitoring and control, land management and land-use planning, or in various aspects of conservation, beautification, and preservation of natural and modified landscapes, or in a variety of positions related to outdoor recreation.

FRESHMAN YEAR

First Semester | Second Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110 Prin. of Biology I</td>
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<tr>
<td>CH 101 General Chemistry</td>
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<tr>
<td>ENGL 101 English Composition</td>
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<tr>
<td>MTHSC 101 Finite Probability</td>
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SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>BIOCH 210 Elem. Biochemistry</td>
<td>4</td>
</tr>
<tr>
<td>BOT 201 Field Botany</td>
<td>3</td>
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<tr>
<td>PHYS 207 General Physics I</td>
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JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>BOT 331 Intro. Plant Taxonomy</td>
<td>3</td>
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<tr>
<td>BOT 451 Plant Anatomy</td>
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<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>BOT 421 Plant Physiology</td>
<td>4</td>
</tr>
<tr>
<td>MICRO 305 General Microbiology</td>
<td>4</td>
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<tr>
<td>Zoology Elective</td>
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<td>6</td>
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<td></td>
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CHEMISTRY

Chemistry, an experimental discipline based on observation guided by molecular theory, is of fundamental importance in much of modern science and technology. Its molecular concepts form the basis for ideas about complex material behavior. Due to the fundamental nature and extensive application of chemistry, an unusually large variety of challenging opportunities to contribute in the science-oriented community are open to the student whose education is built around the principles of this discipline.

The curriculum, through the career requirement options and the large number of electives, provides each student an opportunity to select a coherent program of study beyond the basic courses suited to his or her needs. Career requirement options are provided for students anticipating graduate study in chemistry or related fields; employment following the BS degree in laboratory, production, technical sales or management positions; professional studies (e.g., medicine); chemical physics; geochemistry; and employment in fields requiring extensive preparation in courses other than sciences (e.g., patent law and technical writing). Significant features of the curriculum are the student's extensive participation in experimental work and the opportunity to take part in a research investigation during the junior and senior years.

FRESHMAN YEAR

First Semester Second Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Course</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>CH 101 General Chemistry</td>
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<td>CH 112 General Chemistry</td>
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<td>ENGL 101 English Composition</td>
<td>3</td>
<td>ENGL 102 English Composition</td>
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<tr>
<td>GER 101 Elementary German</td>
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<td>GER 102 Elementary German</td>
<td>4</td>
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<tr>
<td>MTHSC 106 Cal. of One Var. I</td>
<td>4</td>
<td>MTHSC 108 Cal. of One Var. II</td>
<td>4</td>
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<td></td>
<td>PHYS 122 Phys. with Cal. I</td>
<td>3</td>
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SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Course</th>
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<tbody>
<tr>
<td>CH 223 Organic Chemistry</td>
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<td>CH 224 Organic Chemistry</td>
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<tr>
<td>CH 225 Organic Chemistry Lab.</td>
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<td>CH 226 Organic Chemistry Lab.</td>
<td>2</td>
</tr>
<tr>
<td>MTHSC 206 Calculus of Sev. Var.</td>
<td>4</td>
<td>MTHSC 208 Engineering Math. I</td>
<td>4</td>
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<tr>
<td>PHYS 221 Phys. with Cal. II</td>
<td>3</td>
<td>PHYS 222 Phys. with Cal. III</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 223 Physics Lab. I</td>
<td>1</td>
<td>PHYS 224 Physics Lab. II</td>
<td>1</td>
</tr>
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<td>Literature Requirement¹</td>
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<td>Literature Requirement¹</td>
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¹ Electives: A minimum of 12 hours from at least two subject areas of the social sciences; a minimum of 12 hours from at least two subject areas of the humanities; a minimum of 15 hours from courses related to anticipated vocation and subject to approval by the student’s adviser.
### JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Credits</th>
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<tr>
<td>CH 313</td>
<td>Quantitative Analysis</td>
<td>3</td>
<td>(3.0)</td>
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<tr>
<td>CH 315</td>
<td>Quantitative Anal. Lab</td>
<td>2</td>
<td>(0.6)</td>
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<tr>
<td>CH 331</td>
<td>Physical Chemistry</td>
<td>3</td>
<td>(3.0)</td>
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<tr>
<td>CH 339</td>
<td>Physical Chemistry Lab</td>
<td>1</td>
<td>(0.3)</td>
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<tr>
<td>CPSC 110</td>
<td>Elem. Comp. Prog.</td>
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<td>(3.0)</td>
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<td>Elective</td>
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### SENIOR YEAR

<table>
<thead>
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<th>Hours</th>
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<tbody>
<tr>
<td>CH 332</td>
<td>Physical Chemistry</td>
<td>3</td>
<td>(3.0)</td>
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<tr>
<td>CH 340</td>
<td>Physical Chemistry Lab</td>
<td>1</td>
<td>(0.3)</td>
</tr>
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<td>CH 411</td>
<td>Instrumental Analysis</td>
<td>4</td>
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<td>Electives</td>
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**16**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH 331</td>
<td>Physical Chemistry</td>
<td>3</td>
<td>(3.0)</td>
</tr>
<tr>
<td>CH 339</td>
<td>Physical Chemistry Lab</td>
<td>1</td>
<td>(0.3)</td>
</tr>
<tr>
<td>CPSC 110</td>
<td>Elem. Comp. Prog.</td>
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<td>(3.0)</td>
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<tr>
<td>Elective</td>
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<td>4</td>
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</tbody>
</table>

**17**

130 Total Semester Hours

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1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

2 Students planning to take biology courses register for BIOL 110 and 111 in the freshman year and delay GER 101, 102 until the junior year.

3 At least six hours must be in humanities and or social sciences.

4 A minimum of ten hours to be selected from advanced science, engineering, and mathematical sciences courses. (See adviser.)

### GEOLOGY

Geology is a relatively young science. The word itself is only about 200 years old. It means the science of the earth. Such a science must be involved with the physics and chemistry of materials which comprise the earth, but equally important it must consider the development of life on earth. Fundamentally, the chemical, physical and biological responses to various environments on and in the earth must be thoroughly understood so that the historical development of the earth may be deduced, predictions of the future inferred, and natural resources intelligently developed.

Industry in our modern civilization is dependent on minerals and rocks. Metals have their origin in them as do our chief power sources, coal, petroleum, and radioactive minerals. The power and wealth of nations depend largely on their exploration, control and development of mineral wealth.

Geologists today are entering upon a new era. Widening horizons are indicated by employment not only in mineral-producing industries but by railroads, municipalities, engineering firms, and water authorities. For this reason, it is important that the geologist’s education rest on a broad yet rigorous base.

This curriculum provides the student with the fundamentals in the geological sciences and excellent support in the other basic sciences. On successful completion of the Bachelor of Science program the student should be adequately prepared for employment or for graduate study in any field of geology.
### Degrees and Curricula

<table>
<thead>
<tr>
<th>FRESHMAN YEAR</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td><strong>Second Semester</strong></td>
</tr>
<tr>
<td>CH 101 General Chemistry ............ 4 (3,3)</td>
<td>CH 102 or 112 General Chemistry ... 4 (3,3)</td>
</tr>
<tr>
<td>ENGL 101 English Composition .......... 3 (3,0)</td>
<td>ENGL 102 English Composition .......... 3 (3,0)</td>
</tr>
<tr>
<td>MTHSC 106 Cal. of One Var. I .......... 4 (4,0)</td>
<td>MTHSC 106 Cal. of One Var. II ........ 4 (4,0)</td>
</tr>
<tr>
<td>Modern Language^2 .................... 4 (3,1)</td>
<td>Modern Language^2 .................... 4 (3,1)</td>
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<thead>
<tr>
<th>SOPHOMORE YEAR</th>
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<tbody>
<tr>
<td>GEOL 101 Physical Geology .......... 4 (3,2)</td>
<td>GEOL 102 Historical Geology ........ 4 (3,3)</td>
</tr>
<tr>
<td>HIST 172 Western Civilization ...... 3 (3,0)</td>
<td>HIST 173 Western Civilization ...... 3 (3,0)</td>
</tr>
<tr>
<td>MTHSC 206 Calculus of Sev. Var. ... 4 (4,0)</td>
<td>PHYS 122 Phys. with Cal. I ........... 3 (2,2)</td>
</tr>
<tr>
<td>Literature Requirement^1 .......... 3 (3,0)</td>
<td>Literature Requirement^1 .......... 3 (3,0)</td>
</tr>
<tr>
<td>Modern Language^2 .................. 3 (3,0)</td>
<td>Modern Language^2 .................. 3 (3,0)</td>
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<td><strong>16</strong></td>
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<tbody>
<tr>
<td>BIOL 103 General Biology I .......... 3 (3,0)</td>
<td>BIOL 104 General Biology II .......... 3 (3,0)</td>
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<tr>
<td>BIOL 105 General Biology Lab. I ...... 1 (0,3)</td>
<td>BIOL 106 General Biology Lab. II ...... 1 (0,3)</td>
</tr>
<tr>
<td>PHYS 221 Phys. with Cal. II .......... 3 (2,2)</td>
<td>EXST 301 Introductory Statistics ...... 3 (2,2)</td>
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<tr>
<td>PHYS 223 Physics Lab. I ............. 1 (0,3)</td>
<td>GEOL 309 Petrology .................. 3 (2,3)</td>
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<td>Elective^3 ......................... 4</td>
<td>GEOL 313 Stratigraphy and Sed. ...... 3 (3,0)</td>
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| Summer Geology Field Course^4 ........ 6 | |

<table>
<thead>
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<tbody>
<tr>
<td>GEOL 402 Structural Geology .......... 3 (2,2)</td>
<td>GEOL 310 Optical Mineralogy .......... 3 (1,4)</td>
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<td>GEOL 403 Invert. Paleontology .......... 3 (2,3)</td>
<td>GEOL 404 Economic Geology .......... 3 (3,0)</td>
</tr>
<tr>
<td>GEOL 411 Research Problems .......... 1 (0,3)</td>
<td>Elective ......................... 10</td>
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<td>Elective^3 ......................... 10</td>
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<td><strong>17</strong></td>
<td><strong>134 Total Semester Hours</strong></td>
</tr>
</tbody>
</table>

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1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2 German or French is recommended. Two years in the same language are required.
3 At least 12 hours must be elected from the humanities and/or social sciences.
4 Clemson University does not conduct a field course in geology, but attendance at a course approved by the geology staff is required.

### MATHEMATICAL SCIENCES

The Mathematical Sciences curriculum, carefully designed to possess a high degree of versatility, equips the student with the knowledge of mathematical concepts and methods that are applicable in the areas of physics, computer science, communication theory, data processing, statistics, operations research, economics, or any branch of the physical sciences in which a strong mathematical background is desired. In addition to containing the basic courses which provide the student with the mathematical skills necessary in the use of mathematics as it relates to other fields of knowledge, the curriculum allows the student in his junior year to select one of ten optional sets of courses, providing an introduction to an area where mathematics is applied. These options are Actuarial Science, Applied

In addition to the overall goal of preparing the student to cope with the dynamics of any mathematical environment, the curriculum seeks to provide an adequate background for the student who plans to pursue graduate study in mathematics or to fill many interesting positions in space research, computer development, business, or government research. Those electing the Biology option will have the necessary preparation for entering medical school.

### FRESHMAN YEAR

<table>
<thead>
<tr>
<th></th>
<th>First Semester</th>
<th></th>
<th>Second Semester</th>
<th></th>
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<tbody>
<tr>
<td>CH 101 General Chemistry</td>
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<td>CH 102 General Chemistry</td>
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<tr>
<td>CPSC 110 Elem. Comp. Prog.</td>
<td>3 (3.0)</td>
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<td>ECON 211 Prin. of Economics</td>
<td>3 (3.0)</td>
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<tr>
<td>ENGL 101 English Composition</td>
<td>3 (3.0)</td>
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<td>ENGL 102 English Composition</td>
<td>3 (3.0)</td>
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<td>MTHSC 106 Cal. of One Var. I</td>
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<td>MTHSC 108 Cal. of One Var. II</td>
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### SOPHOMORE YEAR

<table>
<thead>
<tr>
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<th>First Semester</th>
<th></th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>MTHSC 206 Calculus of Sev. Var.</td>
<td>4 (4.0)</td>
<td></td>
<td>HIST 172 or 173 Western Civ.</td>
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<tr>
<td>MTHSC 301 Statistical Theory and Methods I</td>
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<td>MTHSC 208 Engineering Math. I</td>
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<tr>
<td>PHYS 122 Phys. with Cal. I</td>
<td>3 (2.2)</td>
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<td>MTHSC 411 Linear Algebra</td>
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### JUNIOR YEAR

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<tr>
<th></th>
<th>First Semester</th>
<th></th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>MTHSC 360 Inter. Math. Computing</td>
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<td>MTHSC 350 Intro. to Math. Models</td>
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<td>MTHSC 453 Advanced Calculus I</td>
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<td>MTHSC 454 Advanced Calculus II</td>
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<td>or MTHSC 463 Math. Analysis I</td>
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<td>or MTHSC 464 Math. Analysis II</td>
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<td>Option</td>
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### SENIOR YEAR

<table>
<thead>
<tr>
<th></th>
<th>First Semester</th>
<th></th>
<th>Second Semester</th>
<th></th>
</tr>
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<tbody>
<tr>
<td>ENGL 301 Public Speaking</td>
<td>3 (3.0)</td>
<td></td>
<td>Mathematical Sciences Elective</td>
<td>3</td>
</tr>
<tr>
<td>MTHSC 402 Theory of Probability</td>
<td>3 (3.0)</td>
<td></td>
<td>Option</td>
<td>3</td>
</tr>
<tr>
<td>MTHSC 412 Intro. to Mod. Algebra</td>
<td>3 (3.0)</td>
<td></td>
<td>Elective</td>
<td>10</td>
</tr>
<tr>
<td>or MTHSC 419 Discrete Math. Structures I</td>
<td>3 (3.0)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Option</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>16</td>
<td></td>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

### OPTIONS

**Chemistry**
- CH 331 Physical Chemistry | 3 (3.0)
- CH 332 Physical Chemistry | 3 (3.0)
- CH 339 Physical Chemistry Lab. | 1 (0.3)
- CH 340 Physical Chemistry Lab. | 1 (0.3)
- CH 402 Inorganic Chemistry | 3 (3.0)
- CH 435 Spectroscopy and Mol. Struct. | 3 (3.0)

**Statistics**
- MTHSC 404 Intro. to Stoch. Proc. | 3 (3.0)
- MTHSC 405 Statistical Theory and Methods II | 3 (3.0)
- MTHSC 409 Statistical Theory and Methods III | 3 (3.0)
- MTHSC 471 Applied Statistical Decision Theory | 3 (3.0)

130 Total Semester Hours
### Managerial Science

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IM 402 Oper. Plan. and Control</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>IM 404 Managerial Economics</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 404 Intro. to Stoch. Proc.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 452 Linear Programming</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 418 Mgt. Inform. Sys.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>or IM 418 Mgt. Inform. Sys.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 409 Stat. Theory and Meth.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 461 Intro. to Num. Anal.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 404 Intro. to Stoch. Proc.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 409 Stat. Theory and Meth.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 418 Mgt. Inform. Sys.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>or MTHSC 461 Intro. to Num. Anal.</td>
<td>3 (3.0)</td>
</tr>
</tbody>
</table>

Total: 12

### Physics

<table>
<thead>
<tr>
<th>Course Description</th>
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<tbody>
<tr>
<td>PHYS 321 Mechanics I</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>PHYS 322 Mechanics II</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>or PHYS 441 Elec. and Mag. II</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>PHYS 340 Elec. and Magnetism I</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>or PHYS 321 Mechanics I</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>or PHYS 322 Mechanics II</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>or PHYS 441 Elec. and Mag. II</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>or PHYS 340 Elec. and Magnetism I</td>
<td>3 (3.0)</td>
</tr>
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</table>

Total: 9

### Applied Mathematical Sciences

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Applications Area</td>
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<tr>
<td>Three of the following courses:</td>
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<tr>
<td>MTHSC 309 Engr. Math. II</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 407 Partial Diff. Equations</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 453 Complex Variables</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 460 Intro. to Num. Anal.</td>
<td>3 (3.0)</td>
</tr>
</tbody>
</table>

Total: 12

---

1. To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2. Those qualifying for advanced placement in languages or wanting to take languages the freshman year may take them in place of these courses.
3. These electives must be approved by the adviser. Total electives upon graduation must include one of the following sequences: BIOL 103, 104, 105, 106; ECON 314, MASC 311; PHYS 221, 222, 222, 224. The sequence chosen depends upon the option.
4. To be selected from MTHSC 403, 404, 405.
5. Select the following sequence: ECON 314, MASC 311.
6. Select the following sequence: PHYS 221, 222, 222, 224.
7. Select the following sequence: BIOL 103, 104, 105, 106.
8. Students in the Chemistry option must take CH 112.

### MATHEMATICAL SCIENCES—ACTUARIAL SCIENCE OPTION

#### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH 101 General Chemistry</td>
<td>CH 102 General Chemistry</td>
</tr>
<tr>
<td>CPSC 110 Elem. Comp. Prog</td>
<td>ENGL 101 English Composition</td>
</tr>
<tr>
<td>MTHSC 106 Cal. of One Var.</td>
<td>MTHSC 106 Cal. of One Var.</td>
</tr>
<tr>
<td>MTHSC 150 Intro. to Math. Sci.</td>
<td>MTHSC 231 Math. of Life Ins.</td>
</tr>
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Total: 15

#### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 211 Prin. of Economics</td>
<td>ECON 306 Risk and Insurance</td>
</tr>
<tr>
<td>MTHSC 206 Calculus of Sev. Var.</td>
<td>ECON 314 Inter. Econ. Theory</td>
</tr>
<tr>
<td>MTHSC 301 Statistical Theory and Methods I</td>
<td>MTHSC 208 Engineering Math. I</td>
</tr>
<tr>
<td>Literature Requirement 1</td>
<td>MTHSC 411 Linear Algebra</td>
</tr>
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</table>

Total: 16

#### JUNIOR YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>ACCT 201 Principles of Accounting</td>
<td>ACCT 301 Intermed. Accounting</td>
</tr>
<tr>
<td>MTHSC 430 Actuarial Finite Diff.</td>
<td>MTHSC 431 Theory of Interest</td>
</tr>
<tr>
<td>MTHSC 454 Advanced Calculus II</td>
<td>MTHSC 454 Advanced Calculus II</td>
</tr>
<tr>
<td>Modern Language</td>
<td>Modern Language</td>
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<tr>
<td>Elective</td>
<td>Elective</td>
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Total: 16
### SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>ENGL 301 Public Speaking</td>
<td>3 (3.0)</td>
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<tr>
<td>MASC 311 Intro. to Econometrics</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 350 Intro. to Math. Models</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 402 Theory of Prob.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Elective</td>
<td>4</td>
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<tr>
<td></td>
<td>16</td>
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<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MTHSC 403 Statistical Inference</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 412 Intro. to Mod. Algebra</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>or MTHSC 419 Discrete Math.</td>
<td>3 (3.0)</td>
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<tr>
<td>MTHSC 432 Actuarial Science</td>
<td>3 (3.0)</td>
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<tr>
<td>Elective</td>
<td>10</td>
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<td></td>
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</tbody>
</table>

130 Total Semester Hours

---

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

2 Those qualifying for advanced placement in languages or wanting to take languages the freshman year may take them in place of these courses.

3 Electives must be approved by adviser.

4 MTHSC 430 and 431 will be offered even numbered years. Therefore, MTHSC 402, 403, 432 should be scheduled by juniors or seniors during the off year.

### MATHEMATICAL SCIENCES—BIOLOGY OPTION

#### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 103 General Biology I</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>BIOL 105 General Biology Lab. I</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>CPSC 110 Elem. Comp. Prog.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 150 Intro. to Math. Sci.</td>
<td>4 (4.0)</td>
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<td>15</td>
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<table>
<thead>
<tr>
<th>Second Semester</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 104 General Biology II</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>BIOL 106 General Biology Lab. II</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>ECON 211 Principles of Economics</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>ENGL 102 English Composition</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 108 Cal. of One Var. I</td>
<td>4 (4.0)</td>
</tr>
<tr>
<td>Elective</td>
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#### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>CH 101 General Chemistry</td>
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<tr>
<td>MTHSC 206 Calculus of Sev. Var.</td>
<td>4 (4.0)</td>
</tr>
<tr>
<td>MTHSC 301 Statistical Theory and Methods I</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>PHYS 207 General Physics I</td>
<td>4 (3.2)</td>
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<tr>
<td>Literature RequirementI</td>
<td>3 (3.0)</td>
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<table>
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<tbody>
<tr>
<td>CH 112 General Chemistry</td>
<td>4 (3.3)</td>
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<tr>
<td>MTHSC 208 Engineering Math. I</td>
<td>4 (4.0)</td>
</tr>
<tr>
<td>MTHSC 411 Linear Algebra</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>PHYS 208 General Physics II</td>
<td>4 (3.2)</td>
</tr>
<tr>
<td>Literature RequirementI</td>
<td>3 (3.0)</td>
</tr>
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<td>18</td>
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#### JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CH 223 Organic Chemistry</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>CH 227 Organic Chemistry Lab.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>or MTHSC 453 Advanced Calculus I</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>or MTHSC 463 Math. Analysis I</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Modern Language</td>
<td>4 (3.1)</td>
</tr>
<tr>
<td>Elective</td>
<td>2</td>
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<tr>
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<td>16</td>
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<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CH 224 Organic Chemistry</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>CH 228 Organic Chemistry Lab.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 350 Intro. to Math. Models</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 454 Advanced Calculus II</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>or MTHSC 464 Math. Analysis II</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Modern Language</td>
<td>4 (3.1)</td>
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<tr>
<td>Elective</td>
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<tr>
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<td>16</td>
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#### SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BOT 202 Survey of Plant King</td>
<td>4 (3.3)</td>
</tr>
<tr>
<td>or ZOOL 202 Vert. Zoology</td>
<td>4 (3.3)</td>
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<tr>
<td>MTHSC 402 Theory of Probability</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MTHSC 412 Intr. to Mod. Algebra</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>or MTHSC 419 Discrete Math.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Structures I</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Elective</td>
<td>4</td>
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<tr>
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<td>14</td>
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</tbody>
</table>

130 Total Semester Hours

---

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

2 Those qualifying for advance placement in languages or wanting to take languages the freshman year may take them in place of these courses.

3 Electives must be approved by adviser.

4 To be selected from MTHSC 403, 404, or 405.
### MATHEMATICAL SCIENCES—COMPUTER SCIENCE OPTION

#### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th></th>
<th>Second Semester</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CH 101 General Chemistry(^2)</td>
<td>4 (3,3)</td>
<td>CH 102 General Chemistry(^2)</td>
<td>4 (3,3)</td>
</tr>
<tr>
<td>CPSC 110 Elem. Comp. Prog.</td>
<td>3 (3,0)</td>
<td>ECON 211 Principles of Economics</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>3 (3,0)</td>
<td>ENGL 102 English Composition</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>MTHSC 106 Cal. of One Var. I</td>
<td>4 (4,0)</td>
<td>MTHSC 108 Cal. of One Var. II</td>
<td>4 (4,0)</td>
</tr>
<tr>
<td>MTHSC 150 Intro. to Math. Sci.</td>
<td>1 (1,0)</td>
<td>Computer Science Elective(^3)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
<td>17</td>
</tr>
</tbody>
</table>

#### SOPHOMORE YEAR

| CPSC 230 Assembly Lang. Prog.                        | 3 (3,0)| HIST 172 or 173 Western Civ.                        | 3 (3,0) |
| MTHSC 206 Calculus of Sev. Var.                     | 4 (4,0)| MTHSC 208 Engineering Math. I                       | 4 (4,0) |
| MTHSC 301 Statistical Theory and Methods I          | 3 (3,0)| MTHSC 410 Linear Algebra                            | 3 (3,0) |
| Literature Requirement\(^1\)                        | 3 (3,0)| Literature Requirement\(^1\)                        | 3 (3,0) |
| Elective                                            | 3      |                                                      | 16     |
|                                                     | 16     |                                                      |        |

#### JUNIOR YEAR

| MTHSC 350 Intro. to Math. Models                     | 3 (3,0)| ENGL 301 Public Speaking                            | 3 (3,0) |
| MTHSC 460 Intro. to Num. Anal. I                    | 3 (3,0)| MTHSC 402 Theory of Probability                    | 3 (3,0) |
| PHYS 122 Phys. with Cal. I                          | 3 (2,2)| MTHSC 412 Intro. to Mod. Algebra                   | 3 (3,0) |
| Modern Language                                     | 4 (3,1)| or MTHSC 419 Discrete Math.                        |        |
| Elective\(^2\)                                      | 4      | Structures I                                        | 3 (3,0) |
|                                                    | 17     | Modern Language                                     | 3 (3,1) |
|                                                    |        | Elective\(^3\)                                      | 4      |
|                                                    |        |                                                      | 17     |

#### SENIOR YEAR

| MTHSC 453 Advanced Calculus I                       | 3 (3,0)| MTHSC 454 Advanced Calculus II                     | 3 (3,0) |
| or MTHSC 463 Math. Analysis I                       | 3 (3,0)| or MTHSC 464 Math. Analysis II                     | 3 (3,0) |
| Computer Science Elective\(^3\)                     | 3      | Computer Science Elective\(^3\)                    | 3      |
| Mathematical Sciences Elective\(^4\)                | 3      | Elective\(^3\)                                      | 10     |
| Elective                                            | 7      |                                                      | 16     |
|                                                     | 16     |                                                      |        |

130 Total Semester Hours

---

\(^1\) To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

\(^2\) Those qualifying for advance placement in languages or wanting to take languages the freshman year may take them in place of these courses.

\(^3\) These electives must be approved by adviser. Total electives upon graduation must include one of the following sequences: PHYS 221, 223, 222, 224; BIOL 103, 104, 105, 106; ECON 314, MASC 311.

\(^4\) To be selected from the following: MTHSC 403, 404, 405, 452.

5 Select from 300- or 400-level computer science courses or mathematical sciences computing courses.

### MEDICAL TECHNOLOGY

Registered (ASCP) medical technologists are professionals whose broad knowledge gained from college science courses and clinical laboratory training gives them the ability to perform complex analyses used in the modern clinical laboratory. The quality of performance coming from the medical laboratory is controlled by the registered medical technologists. They are responsible for their own work as well as for the work of those under their area of supervision. In the hospital laboratory, medical technologists are directly responsible to the pathologist. In addition to jobs in the hospital laboratory, medical technologists are employed by private, state, and federal health laboratories and by pharmaceutical companies.

The program in Medical Technology at Clemson University consists of three years of lectures and laboratories on the Clemson campus.
and one year of clinical training at an accredited school of medical technology. The courses required in the first three years of the program must be completed before the student can begin the clinical (fourth) year. The student must also have a grade-point ratio of 2.0 or higher before entering the fourth year. Clemson University is presently affiliated with three schools of medical technology. They are located at Anderson Memorial Hospital, Greenville General Hospital, and Self Memorial Hospital at Greenwood. Students are selected by the schools of medical technology on a competitive basis. Applications for the schools of medical technology should be made at the beginning of the sophomore year.

Upon satisfactory completion of the requirements of the curriculum, the student will receive the Bachelor of Science degree in Medical Technology from Clemson University.

### FRESHMAN YEAR

<table>
<thead>
<tr>
<th></th>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
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<tbody>
<tr>
<td>BIOL 110 Prin. of Biology I</td>
<td>5 (4.3)</td>
<td>BIOL 111 Prin. of Biology II</td>
</tr>
<tr>
<td>CH 101 General Chemistry</td>
<td>4 (3.3)</td>
<td>CH 112 General Chemistry</td>
</tr>
<tr>
<td>ENGL 101 English Composition</td>
<td>3 (3.0)</td>
<td>ENGL 102 English Composition</td>
</tr>
<tr>
<td>MT 101 Intro. to Med. Tech.</td>
<td>1 (1.0)</td>
<td>Mathematical Sciences Requirement</td>
</tr>
<tr>
<td>MTHSC 106 Cal. of One Var. I</td>
<td>4 (4.0)</td>
<td>Elective</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>18 (17-18)</td>
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### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th></th>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
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<tbody>
<tr>
<td>CH 223 Organic Chemistry</td>
<td>3 (3.0)</td>
<td>BIOC 301 Molecular Biology</td>
</tr>
<tr>
<td>CH 227 Organic Chemistry Lab.</td>
<td>1 (0.3)</td>
<td>CH 224 Organic Chemistry</td>
</tr>
<tr>
<td>HIST 172 Western Civilization</td>
<td>3 (3.0)</td>
<td>CH 228 Organic Chemistry Lab.</td>
</tr>
<tr>
<td>MICRO 305 General Microbiology</td>
<td>4 (3.3)</td>
<td>Literature Requirement</td>
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<tr>
<td>Literature Requirement</td>
<td>3 (3.0)</td>
<td>Physics Elective</td>
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<td>Physics Elective</td>
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### JUNIOR YEAR

<table>
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<tr>
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<th>Second Semester</th>
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<tbody>
<tr>
<td>CH 313 Quantitative Analysis</td>
<td>3 (3.0)</td>
<td>MICRO 411 Pathogenic Bacteriology</td>
</tr>
<tr>
<td>and CH 317 Quan. Anal. Lab.</td>
<td>1 (0.3)</td>
<td>Humanities Elective</td>
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<tr>
<td>or CH 310 Elem. Chem. Inst.</td>
<td>4 (2.6)</td>
<td>Option Requirement</td>
</tr>
<tr>
<td>GEN 305 Intro. and Molec. Gen.</td>
<td>4 (3.3)</td>
<td>Social Science Elective</td>
</tr>
<tr>
<td>MICRO 414 Basic Immunology</td>
<td>3 (2.3)</td>
<td>Elective</td>
</tr>
<tr>
<td>Humanities Elective</td>
<td>3</td>
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</table>

### SENIOR YEAR

(52 Weeks)

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
<th>Lecture Hours</th>
<th>Seminar Hours</th>
<th>Clinical Practice Hours</th>
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<tr>
<td>MT 401 Serology and Immunology</td>
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<td>21</td>
<td>10</td>
<td>49</td>
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<tr>
<td>MT 402 Microbiology</td>
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<tr>
<td>MT 403 Hematology</td>
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<td>MT 404 Blood Bank</td>
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<td>8</td>
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<td>MT 407 Urinalysis</td>
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<td>MT 408 Chemistry</td>
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<tr>
<td>MT 409 Radioisotopes</td>
<td>1</td>
<td>2</td>
<td>0</td>
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1To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2To be selected from CPSC 110, EXST 301, MTHSC 108, 301.
3To be chosen from courses required to complete an alternate degree should the student not be accepted to a hospital school after completion of the academic requirement for the baccalaureate degree in Medical Technology.
### MICROBIOLOGY

Microbiology deals with the study of bacteria, viruses, yeasts, filamentous fungi, protozoa, and unicellular algae. The microbiologist seeks to describe these organisms in terms of their structures, functions and processes of reproduction, growth and death, at both the cellular and molecular levels. He is also concerned with their ecology, particularly in regard to their pathological effects on man, and with their economic importance.

The Microbiology major provides a thorough training in the basic microbiological skills. Furthermore, the student receives instruction in mathematics, physics, chemistry, and biochemistry, all of which are essential to the training of a modern-day microbiologist. Through a wide choice of electives, the program allows a student to prepare for a variety of careers. The Microbiology curriculum with Molecular Biology option is recommended for students planning postgraduate programs. The microbiology graduate may enter graduate school in the fields of microbiology, biochemistry, bioengineering or related disciplines; he may enter a medical or dental school; or pursue a career in one of the many industries or public service departments dependent upon microbiology. Some of these are the fermentation and drug industries, medical and public health microbiology, various food industries, and agriculture.

Microbiology majors planning to apply for admission to a medical or dental school should inform their advisers immediately upon entering the Microbiology program.

<table>
<thead>
<tr>
<th>FRESHMAN YEAR</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td><strong>Second Semester</strong></td>
</tr>
<tr>
<td>BIOL 110 Prin. of Biology I</td>
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<tr>
<td>CH 101 General Chemistry</td>
<td>4 (3,3)</td>
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<td>ENGL 101 English Composition</td>
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<td>MTHSC 106 Cal. of One Var. I</td>
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<table>
<thead>
<tr>
<th><strong>Second Semester</strong></th>
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<tbody>
<tr>
<td>BIOL 111 Prin. of Biology II</td>
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<tr>
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<td>Math. Sci. Requirement2</td>
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<thead>
<tr>
<th>SOPHOMORE YEAR</th>
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<tr>
<td>CH 223 Organic Chemistry</td>
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<td>CH 227 Organic Chemistry Lab</td>
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<td>CH 224 Organic Chemistry</td>
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<td>CH 228 Organic Chemistry Lab</td>
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<td>Literature Requirement1</td>
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<tr>
<td>Math. Sci. or Sci. Elective3</td>
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<td>Microbiology Elective4</td>
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<th>JUNIOR YEAR</th>
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<tr>
<td>ENGL 301 Public Speaking</td>
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<tbody>
<tr>
<td>GEN 305 Intro. and Molec. Gen.</td>
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<td>MICRO 412 Bacterial Physiology</td>
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<td>Elective4</td>
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### SENIOR YEAR

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<th>Course</th>
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<tr>
<td>Elective</td>
<td>14-13</td>
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<td><strong>134 Total Semester Hours</strong></td>
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</table>

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

2 MTHSC 108 is required for the Microbiology-Molecular Biology option. Microbiology majors may select from CPSC 110, EXST 301, MTHSC 108, 301.

3 To be selected from EXST 301, GEOL 101, MTHSC 108, or any course at the sophomore level or above offered by the College of Sciences, excluding microbiology.

4 A minimum of 15 credits must be selected from the following courses: BOT 411, 413, MICRO 400, 403, 407, 410, 413, 414, 415, 416, 491, PLPA 456, PS 458, ZOOL 403, 496.

5 To be selected from the following course sequences: either PHYS 207, 208 or 122, 221, 223. This curriculum provides a minimum of 22 open approved electives. Military science or aerospace studies may be elected if desired.

### MICROBIOLOGY — MOLECULAR BIOLOGY OPTION

See Microbiology curriculum for Freshman year.

### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>First</td>
<td>CH 223 Organic Chemistry</td>
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<tr>
<td></td>
<td>CH 227 Organic Chemistry Lab.</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td></td>
<td>MICRO 305 General Microbiology</td>
<td>4 (3.3)</td>
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<td></td>
<td>Math. Sci. Requirement</td>
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<tr>
<td></td>
<td>Literature Requirement</td>
<td>3 (3.0)</td>
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<td></td>
<td>Social Science Elective</td>
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<tr>
<td>Second</td>
<td>BIOCH 301 Molecular Biology</td>
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<tr>
<td></td>
<td>CH 228 Organic Chemistry Lab.</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td></td>
<td>GEN 305 Intro. and Molec. Gen.</td>
<td>4 (3.3)</td>
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<tr>
<td></td>
<td>Literature Requirement</td>
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<tr>
<td></td>
<td>Microbiology Elective</td>
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### JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 301 Public Speaking</td>
<td>3 (3.0)</td>
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<tr>
<td>MICRO 401 Adv. Bacteriology</td>
<td>4 (2.6)</td>
</tr>
<tr>
<td>MICRO 414 Basic Immunology</td>
<td>3 (2.3)</td>
</tr>
<tr>
<td>Physics Elective</td>
<td>4-3</td>
</tr>
<tr>
<td>Elective</td>
<td>3-4</td>
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<td><strong>Total</strong></td>
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<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CH 330 Intro. to Physical Chem.</td>
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</tr>
<tr>
<td>or PHYS 417 Intro. to Biophys.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>MICRO 411 Path. Bacteriology</td>
<td>4 (3.3)</td>
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<tr>
<td>MICRO 412 Bacterial Physiology</td>
<td>4 (3.3)</td>
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<tr>
<td>Physics Elective</td>
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<tr>
<td>Elective</td>
<td>3</td>
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<tr>
<td><strong>Total</strong></td>
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### SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOCH 423 Prin. of Biochemistry</td>
<td>3 (3.0)</td>
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<tr>
<td>MICRO 415 Microbial Genetics</td>
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<tr>
<td>MICRO 416 Introductory Virology</td>
<td>3 (3.0)</td>
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<tr>
<td>Social Science Elective</td>
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<td>Elective</td>
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<tr>
<td><strong>Total</strong></td>
<td>16</td>
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</tbody>
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1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

2 To be selected from the following courses: BOT 411, 413, MICRO 400, 403, 407, 410, 413, PLPA 456, PS 458, ZOOL 403, 496.

3 To be selected from CPSC 110, EXST 301, MTHSC 301.

4 To be selected from the following course sequences: Either PHYS 207, 208 or 122, 221, 223.

5 Should include one of the following courses: CH 313, 317, CPSC 110, EXST 301.

Note: Recommended electives in addition to those listed above are BIOCH 425, 426, BIOE 401, MTHSC 206, PHYS 471, 473, ZOOL 459.

This option provides a minimum of 22 open approved electives. Military science or aerospace studies may be elected if desired.
PHYSICS—PHYSICAL AND MATHEMATICAL SCIENCES OPTIONS

Physics is the most fundamental of the natural sciences, and it forms the basis upon which the study of other branches of science is founded. Physics is concerned with the fundamental behavior of matter and energy. Classical physics encompasses the fields of mechanics, heat and thermodynamics, electricity and magnetism, acoustics and optics. Modern physics is concerned with the study of atoms and molecules, atomic nuclei, elementary particles, and the properties of liquids, crystalline solids, and other materials. It also includes the areas of relativity, cosmology, and the large-scale structure of the universe.

The undergraduate Physics curricula are designed to provide students with a strong background in the classical areas of physics as well as a basic introduction into the more important aspects of modern physics. The BS in Physics curriculum is directed toward preparing students for graduate study ultimately leading to the PhD degree or toward research and development work in industrial or governmental laboratories. It also provides a good background for graduate study or industrial work in many areas of engineering and applied science. Experimental modern physics is strongly emphasized.

### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH 101 General Chemistry .................. 4 (3,3)</td>
<td>CH 112 General Chemistry .................. 4 (3,3)</td>
</tr>
<tr>
<td>ENGL 101 English Composition ............ 3 (3,0)</td>
<td>ENGL 102 English Composition ............ 3 (3,0)</td>
</tr>
<tr>
<td>HIST 172 or 173 West. Civilization ........ 3 (3,0)</td>
<td>MTHSC 108 Cal. of One Var. II .......... 4 (4,0)</td>
</tr>
<tr>
<td>MTHSC 106 Cal. of One Var. I ............ 4 (4,0)</td>
<td>PHYS 122 Phys. with Cal. I ............. 3 (2,2)</td>
</tr>
<tr>
<td>PHYS 101 Current Topics in Modern Physics .................. 1 (0,2)</td>
<td>Elective .................. 4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>Total</strong></td>
</tr>
<tr>
<td>15</td>
<td>18</td>
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</tbody>
</table>

### SOPHOMORE YEAR

| FR 101 Elementary French² .................. 4 (3,1) | FR 102 Elementary French² .................. 4 (3,1) |
| or GER 101 Elem. German² ................ 4 (3,1) | or GER 102 Elem. German² ................ 4 (3,1) |
| MTHSC 206 Calculus of Sev. Var. ........ 4 (4,0) | MTHSC 208 Engineering Math. I ........ 4 (4,0) |
| PHYS 221 Phys. with Cal. II ............ 3 (2,2) | PHYS 222 Phys. with Cal. III .......... 3 (2,2) |
| PHYS 223 Physics Lab. I ................ 1 (0,3) | PHYS 224 Physics Lab. II ........ 1 (0,3) |
| Literature Requirement¹ .................. 3 (3,0) | Literature Requirement¹ ........ 3 (3,0) |
| **Total** | **Total** |
| 15 | 18 |

### JUNIOR YEAR

<p>| MTHSC 309 Engineering Math. II³ ........ 3 (3,0) | PHYS 322 Mechanics II .................. 3 (3,0) |
| PHYS 321 Mechanics I ................... 3 (3,0) | PHYS 326 Exper. Physics II ............ 4 (2,6) |
| PHYS 325 Exper. Physics I ............. 4 (2,6) | PHYS 340 Elec. and Magnetism I ........ 3 (3,0) |
| Option .................. 3 | Option .................. 3 |
| Elective .................. 3 | Approved Elective¹ ........ 3 |
| <strong>Total</strong> | <strong>Total</strong> |
| 16 | 16 |</p>
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Notes</th>
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<tbody>
<tr>
<td>PHYS 441</td>
<td>Elec. and Magnetism II</td>
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<td>(3.0)</td>
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<tr>
<td>PHYS 455</td>
<td>Quantum Physics I</td>
<td>3</td>
<td>(3.0)</td>
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<tr>
<td>PHYS 465</td>
<td>Therm. and Stat. Mech.</td>
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<td>(3.0)</td>
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<tr>
<td>Option</td>
<td>(as approved)</td>
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<tr>
<td>Approved Elective</td>
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**SENIOR YEAR**

**PHYS 446** Solid State Physics | 3 | (3.0) |
**PHYS 456** Quantum Physics II | 3 | (3.0) |
Math. Sci. (as approved) | 6 |
12

**OPTIONS**

**Astrophysics**
ASTR 301 General Astronomy | 3 | (3.0) |
ASTR 302 General Astronomy | 3 | (3.0) |
Astronomy (two 400-level courses) | 6 |
12

**Chemical Physics**
CH 331 Physical Chemistry | 3 | (3.0) |
CH 332 Physical Chemistry | 3 | (3.0) |
CH 402 Inorganic Chemistry | 3 | (3.0) |
or PHYS 456 Quantum Physics II | 3 | (3.0) |
CH 435 Spec. and Molec. Struct | 3 | (3.0) |
12

**Electronics**
E&ECE 202 Electric Circuits I | 3 | (3.0) |
E&ECE 203 Electric Circuits Lab I | 1 | (0.2) |
E&ECE 301 Electric Circuits II | 2 | (2.0) |
E&ECE 320 Electronics I | 2 | (2.0) |
E&ECE 325 Electronics Lab. I | 1 | (0.2) |
E&ECE 330 Elec. Sys. Anal. | 3 | (3.0) |
12

**Geophysics**
GEOL 101 Physical Geology | 4 | (3.2) |
GEOL 306 Mineralogy | 3 | (2.3) |
Any two:
GEOL 309 Petrology | 3 | (2.3) |
GEOL 402 Struct. Geology | 3 | (2.2) |
PHYS 446 Solid State Physics | 3 | (3.0) |
13

**Computer Science**
CPSC 110 Elem. Comp. Prog. | 3 | (3.0) |
CPSC 230 Assembly Language Prog. | 3 | (3.0) |
CPSC 428 Structure of Programming Languages | 3 | (3.0) |
or PHYS 446 Solid State Physics | 3 | (3.0) |
MTHSC 460 Intro. to Num. Anal. I | 3 | (3.0) |
12

**Mathematical Physics**
MTHSC 457 Applied Math. I | 3 | (3.0) |
MTHSC 458 Applied Math. II | 3 | (3.0) |
PHYS 456 Quantum Physics II | 3 | (3.0) |
Math. Sci. (as approved) | 3 | (3.0) |
12

**Physics**
PHYS 446 Solid State Physics | 3 | (3.0) |
PHYS 456 Quantum Physics II | 3 | (3.0) |
Math. Sci. (as approved) | 6 |
12

---

1To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2RUSS 101, 102 may be substituted.
3MTHSC 411 may be taken in lieu of MTHSC 309.
4A minimum of 12 hours of electives must be chosen from course offerings in the humanities and social sciences.
PHYSICS—BIOPHYSICS OPTION

The Biophysics option offers an excellent preparation for medical school or graduate work in biological science. It requires a total of 25 credits of approved electives in chemistry, biological science, physics, or mathematics.

FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH 101 General Chemistry</td>
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<td>ENGL 101 English Composition</td>
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<td>MTHSC 106 Cal. of One Var. I</td>
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<tr>
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<td>Biology Elective</td>
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<td>MTHSC 206 Calculus of Sev. Var.</td>
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<tr>
<td>PHYS 223 Physics Lab. I</td>
<td>1 (0,3)</td>
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<tr>
<td>Literature Requirement</td>
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<td></td>
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<td>FR 101 Elementary French</td>
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<td>or GER 101 Elem. German</td>
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<tr>
<td>HIST 172 Western Civilization</td>
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<td>PHYS 321 Mechanics I</td>
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<td>PHYS 325 Experimental Physics I</td>
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<tr>
<td>PHYS 455 Quantum Physics I</td>
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<tr>
<td>PHYS 465 Thermodynamics and Statistical Mechanics</td>
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<td>129 Total Semester Hours</td>
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1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2 RUSS 101, 102 may be substituted.
3 An approved physics course may be substituted for PHYS 465 if the student satisfactorily completes CH 331, 332.
4 A minimum of 12 hours of electives must be chosen from course offerings in the humanities and social sciences.

PREPROFESSIONAL HEALTH STUDIES

The health professions, such as medicine and dentistry, need individuals with a diversity of educational backgrounds and a wide variety of talents and interests. The philosophies of education, the specific preprofessional course requirements, the noncognitive qualifications for enrollment, and the systems of training vary among the professional health schools, but all recognize the desirability of a broad
education—a good foundation in the natural sciences (biology, chemistry, mathematics, and physics), highly developed communication skills, and a solid background in the humanities and social sciences. The absolute requirements for admission to professional health schools are purposely limited to allow latitude for developing individualized undergraduate programs of study; however, all schools of medicine and dentistry require sixteen semester hours of chemistry, including organic chemistry, eight semester hours of biological sciences, eight semester hours of physics, and at least one course in calculus. These requirements in the natural sciences should be balanced with courses in vocabulary building, the humanities (literature, music, art, history, philosophy), and social sciences (economics, political science, psychology, sociology). The basic requirements in the natural sciences and as many as possible of the courses in the humanities and the social sciences should be completed by the third year of study so that the student will be prepared to take the Dental Admission Test or the Medical College Admission Test prior to making application to a professional school.

Undergraduates may prepare also to study optometry, podiatry, and other health professions. While the basic requirements for these professional schools are essentially the same as those for schools of medicine and dentistry, specific requirements for individual schools in these professions vary somewhat; consequently, the interested student is advised to consult with the Coordinator for Preprofessional Health Studies.

At Clemson, rather than having a separate, organized preprofessional health study program, it is felt that an undergraduate student should be allowed to major in any curriculum, so long as the basic entrance requirements of the chosen professional health school are fulfilled. These schools are not so much concerned about a student’s major as they are concerned that the student does well in whichever curriculum he chooses.

Professional health schools have neither preferences nor prejudices concerning any curriculum, which is evidenced by the fact that their entering students represent a broad spectrum of curricula. The emphasis is placed on the student doing well in the curriculum chosen, and this becomes critical as competition increases for the limited number of places available in professional health schools.

PREPHYSICAL THERAPY

Physical Therapy is a transfer, baccalaureate degree program at the Medical University of South Carolina. Students may acquire the prerequisites for the two-year professional training by following the suggested curriculum offered by Clemson University.
First Semester | Second Semester
--- | ---
BIOL 103 General Biology I | 3 (3.0) | BIOL 104 General Biology II | 3 (3.0)
BIOL 105 General Biol. Lab. I | 1 (0.3) | BIOL 106 General Biol. Lab. II | 1 (0.3)
CH 101 General Chemistry | 4 (3.3) | CH 102 General Chemistry | 4 (3.3)
ENGL 101 English Composition | 3 (3.0) | ENGL 102 English Composition | 3 (3.0)
Elective | 6 | Elective | 6

Total: 17

SECOND YEAR

First Semester | Second Semester
--- | ---
PHYS 207 General Physics I | 4 (3.2) | PHYS 208 General Physics II | 4 (3.2)
ZOOL 222 Human Anatomy | 4 (3.3) | ZOOL 223 Human Physiology | 4 (3.3)
Elective | 9 | Elective | 9

Total: 17

68 Total Semester Hours

1 Chemistry requires proficiency in algebra, and physics requires proficiency in trigonometry; therefore, entering freshmen must present a score of 550 or above on Level II of the Mathematics Achievement Test or register in the first semester for MTHSC 105.

PREPHARMACY

Pharmacy is a five-year program, the first two years of which can be taken at Clemson. The student who follows the Prepharmacy curriculum will transfer, as a rule, to the School of Pharmacy at the Medical University of South Carolina, where the final three years will be completed and by which institution the degree in Pharmacy will be awarded.

First Semester | Second Semester
--- | ---
BIOL 103 General Biology I | 3 (3.0) | BIOL 104 General Biology II | 3 (3.0)
BIOL 105 General Biology Lab. I | 1 (0.3) | BIOL 106 General Biology Lab. II | 1 (0.3)
CH 101 General Chemistry | 4 (3.3) | CH 112 General Chemistry | 4 (3.3)
ENGL 101 English Composition | 3 (3.0) | ENGL 102 English Composition | 3 (3.0)
HIST 172 Western Civilization | 3 (3.0) | HIST 173 Western Civilization | 3 (3.0)
Elective | 3 | MTHSC 106 Cal. of One Var. I | 4 (4.0)

Total: 17

SECOND YEAR

First Semester | Second Semester
--- | ---
CH 223 Organic Chemistry | 3 (3.0) | CH 224 Organic Chemistry | 3 (3.0)
CH 227 Organic Chemistry Lab | 1 (0.3) | CH 228 Organic Chemistry Lab | 1 (0.3)
PHYS 207 General Physics I | 4 (3.2) | PHYS 208 General Physics II | 4 (3.2)
SOC 201 Sociological Perspective | 3 (3.0) | SOC 202 Social Problems | 3 (3.0)
Literature Requirement | 3 (3.0) | Literature Requirement | 3 (3.0)
Elective | 3 | Elective | 3

Total: 17

69 Total Semester Hours

1 To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
2 Chemistry requires proficiency in algebra, and physics requires proficiency in trigonometry; therefore, entering freshmen must present a score of 550 or above on Level II of the Mathematics Achievement Test or register in the first semester for MTHSC 105.

ZOOLOGY

Biology is the study of life. Within this broad field, there is a variety of areas and disciplines in which one can become interested. The
modern descriptive, experimental, and predictive study of animal biology is known as zoology. It is a broad area of scientific activity, including the study of all aspects of animal life from the structure and function of the whole organism down to the cellular level of organization, and up through the behavior and interactions of several organisms to the integrated existence of life on the entire planet. Descriptive, functional, and evolutionary questions are investigated at all possible levels.

Majors in Zoology receive broad classroom, laboratory, and field training in classical and modern animal biology with an emphasis on chemistry, mathematics and statistics, and physics as necessary tools. Specialized options in the Zoology curriculum include preparatory training leading to graduate school, the health professions (medicine, dentistry, etc.), veterinary medicine, biomedical engineering, biochemistry, biomathematics, and biophysics.

**FRESHMAN YEAR**

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<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tr>
<td>BIOL 110 Prin. of Biology I</td>
<td>BIOL 111 Prin. of Biology II</td>
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<tr>
<td>CH 101 General Chemistry</td>
<td>CH 112 General Chemistry</td>
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<td>ENGL 101 English Composition</td>
<td>ENGL 102 English Composition</td>
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<td>MTHSC 106 Cal. of One Var. I</td>
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**SOPHOMORE YEAR**

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<tr>
<td>CH 223 Organic Chemistry</td>
<td>BIOCH 301 Molecular Biology</td>
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<td>ZOOL 201 Invertebrate Zoology</td>
<td>CH 224 Organic Chemistry</td>
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<td>or ZOOL 202 Vertebrate Zoology</td>
<td>ZOOL 202 Vertebrate Zoology</td>
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<tr>
<td>Literature Requirement¹</td>
<td>Literature Requirement¹</td>
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**JUNIOR YEAR**

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<tr>
<td>GEN 305 Intro. and Molec. Gen.</td>
<td>MTHSC 301 Statistical Theory and Method I</td>
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<tr>
<td>PHYS 207 General Physics I</td>
<td>PHYS 208 General Physics II</td>
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<tr>
<td>ZOOL 340 Cell Biology</td>
<td>ZOOL 350 Develop. Biology</td>
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<tr>
<td>Botany Elective</td>
<td>Elective²</td>
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<td>Elective³</td>
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**SENIOR YEAR**

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<tr>
<td>ZOOL 420 Principles of Evolution</td>
<td>ZOOL 411 Animal Ecology</td>
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<td>ZOOL 459 Systems Physiology²</td>
<td>Elective³</td>
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<td>Elective³</td>
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135 Total Semester Hours

¹ To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
² ZOOL 457 or 458 may substitute for ZOOL 459 with the approval of the adviser.
³ Electives:
   (a) A minimum of 6 elective hours must be chosen from course offerings in social sciences (geography, economics, history, political science, psychology, and sociology).
   (b) A minimum of 6 elective hours must be chosen from course offerings in the humanities (foreign languages, humanities, literature, philosophy, and religion).
   (c) A minimum of 4 elective hours must be chosen from course offerings in the Department of Zoology. An additional 6 hours may be taken either in the Department of Zoology or in departments offering zoology-related courses approved by the student's adviser.
DESCRIPTION OF COURSES

This list of courses includes for each course the catalog number, title of course, credit in semester hours, class laboratory hours per week, and the description of the course. In general, courses numbered 100-199 are freshman courses; 200-299, sophomore courses; 300-399, junior courses; and 400-499, senior courses. Courses numbered 600 and above are graduate courses and are open only to students admitted to the Graduate School, except that seniors with exceptional records may be enrolled with special permission. Where courses are offered on a schedule, there is a designation F, S or SS following the title of each course, indicating whether it is customarily offered in the fall, spring, or summer school.

ACCOUNTING (ACCT)


101 Accounting and Finance Orientation 1(1,0) A broad overview to the nature of accounting and finance and its role in the business environment. If taken for credit, this course must be completed before any other accounting course.

200 Basic Accounting 3(3,0) This course is designed as a general survey of accounting for non-Accounting majors. (Course not open to Accounting and Financial Management majors.)

201, H201 Principles of Accounting 3(3,0) An introduction to accounting theory with an emphasis on basic accounting procedures and financial statements preparation.


302 Intermediate Accounting 3(3,0) Continuation of ACCT 301 with emphasis on managerial accounting. Preq: ACCT 301.


305 Income Taxation 3(3,0) Interpretation of Federal Income Tax laws, regulations and court decisions with practice in application of these laws to the returns of individuals, partnerships, and corporations. Preq: Junior standing.
307 Managerial Accounting 3(3,0) Emphasizes internal use of accounting data by the manager in establishing plans and objectives, in controlling operations, and in making decisions involved with management of an enterprise. Course cannot be taken for credit by those students required to complete ACCT 303 and 410. *Preq:* ACCT 202.

403 Accounting Research 2(2,0) A directed research course for those students interested in a career in accounting. *Preq:* ACCT 302.

405, 605 Advanced Federal Taxes 3(3,0) Tax planning and research. Advanced phases of income taxation with emphasis on special problems applicable to corporations, partnerships, estates and trusts. *Preq:* ACCT 305.

407 Accounting Research 1(1,0) A directed research course for those students interested in a career in accounting. *Preq:* ACCT 302.

410, 610 Budgeting and Executive Control 3(3,0) The study and application of selected techniques used in the planning and control functions of business organizations. *Preq:* ACCT 303.


415, 615 Auditing 3(3,0) Professional and practical auditing theory. Review of internal controls, audit procedures, and development of audit programs for various types of businesses; consideration of auditor’s professional and ethical standards. *Preq:* ACCT 302.

416, 616 Auditing Practice and Procedure 3(3,0) Practical application of auditing theory through case studies and preparation of work papers in a simulated audit. Special emphasis on audit adjustments, sampling and testing techniques, internal control and flow charting. *Preq:* ACCT 415.

420 Certified Public Accountant Review 3(3,0) Intensive practice in analyzing and solving certified public accountant level accounting problems. *Preq:* ACCT 411 or consent of instructor.

422 Accounting Information Systems 3(3,0) A study of computer-based accounting systems with attention to systems design, application, internal control, auditing the system, and system security. *Preq:* ACCT 302, CPSC 110, or consent of instructor.

425 Contemporary Accounting Theory 3(3,0) Contemporary accounting theory emphasizes the major challenges and controversies within the field of accounting today. Attention is given to theoretical and conceptual issues underlying current financial reporting as well as pragmatic conventions. The evolution of accounting objectives and standards, as evidenced by the pronouncements of professional organizations, will receive special emphasis. *Preq:* ACCT 302.

430, 630 Governmental and Institutional Accounting 3(3,0) Accounting and reporting principles, standards, and procedures used by the Federal government, state and local governments, and other not-for-profit institutions are examined and discussed. Hospital and university accounting are reviewed. Unique aspects of the governmental auditing environment are analyzed. *Preq:* ACCT 302 or consent of instructor.

AEROSPACE STUDIES (AS)

*Professor:* E. F. Rumsey, *Head; Assistant Professors:* L. J. Gregory, Jr., D. H. Sattler, T. E. Smith

109 Air Force Today I 1(1,1) This course deals with the Air Force in the contemporary world through a study of the total force structure: strategic offensive and defensive, general purpose, and aerospace support. Leadership laboratory activities include drill fundamentals, customs, and courtesies of the service.

110 Air Force Today II 1(1,1) Continuation of AS 109. Leadership laboratory includes drill, ceremonies, and an introduction of Air Force career opportunities.
209 Development of Air Power I 1(1,1) The course includes the study of the development of air power from balloons and dirigibles through the peaceful employment of U.S. air power in relief missions and civic action programs in the late 1960s and also the air war in Southeast Asia. Leadership laboratory provides experience in guiding, directing, and controlling an Air Force unit.

210 Development of Air Power II 1(1,1) Continuation of AS 209.

309 Air Force Leadership and Management I 3(3,1) Course emphasizing the individual as a manager. Individual motivational and behavioral processes, leadership, communication, and group dynamics are covered to provide a foundation for the development of the Air Force officer's professional skills. Students will prepare individual and group presentations; write reports; participate in group discussions, seminars, and conferences.

310 Air Force Leadership and Management II 3(3,1) Continuation of AS 309, using the basic managerial processes involving decision-making, utilization of analytical aids in planning, organizing, and controlling environment. Actual case studies are used to enhance learning and communication processes.

409 National Security Policy I 3(3,1) Analysis of the role and function of the military officer in a democratic society and the relationships involved in civil-military interactions. Flight instruction and ground school for pilot candidates. Students will be expected to prepare individual and group presentations for the class, write reports, and participate in group discussions.

410 National Security Policy II 3(3,1) Continuation of AS 409, examining the environmental context in which U.S. defense policy is formulated and implemented. Emphasis placed on initial commissioned service and military justice. Students will be expected to prepare individual and group presentations for the class, write reports, and participate in group discussions, seminars, and conferences.

AGRICULTURAL ECONOMICS (AGEC)


202 Agricultural Economics 3,(3,0)F, S An analytical survey of the various subdivisions of agricultural economics, to include farm organization, enterprise analysis, land economics, marketing, farm prices, governmental farm policies, and the relation of agriculture to the national and international economy.

302 Economics of Farm Management 3(2,3) Economic principles underlying the organization and operation of agricultural firms and related business enterprises. Particular emphasis is directed to management aspects of the farm as a production unit. Preq: AGEC 202 or ECON 211.

308 Quantitative Agricultural Economics 3(3,0) Basic quantitative relationships in agricultural economics are examined and interpreted using mathematics. Emphasis is placed on the use of deterministic models in agricultural production and marketing and in the examination of the interrelationships between the performance of the U.S. economy and the agricultural sector. Preq: AGEC 202 or ECON 211; EXST 301 or MTHSC 203; MTHSC 102 or 106.

309 Economics of Agricultural Marketing 3(3,0) A general course in marketing agricultural commodities with particular emphasis upon food products. Efficiency criteria, consumer behavior, market organizations and institutions, and marketing functions are analyzed. Preq: AGEC 202.

319 Agribusiness Management 3(3,0) A study of the principles used in making management decisions and the application of these principles in agribusiness. Emphasis is given to the application of economics to the solution of problems facing managers of agricultural supply and marketing firms. Preq: AGEC 302 or 309.
351 Advertising and Merchandising 3(3,0)F A general introduction to advertising and merchandising theories and some practice with basic techniques. A partial list of subjects covered includes: function of advertising, propriety in advertising, institutions, media, market research, consumer appeals, loss leaders, mass displays, trademarks and brands, writing copy, color, layout, agencies and integrated advertising campaigns. *Preq:* Junior standing.

352 Public Finance 3(3,0) Principles of financing government, sources of public revenue, objects of public expenditures, problems of fiscal administration, and the application of fiscal policies in stabilizing the national economy. *Preq:* Junior standing.

402, 602 Production Economics 3(3,0) An economic analysis of agricultural production involving (a) the concept of the farm as a firm, (b) principles for decision making, (c) the quantitative nature and use of production and cost functions and their interrelations and application of these principles to resource allocation in farms and among areas. *Preq:* AGEC 308 or ECON 314.

403, 603 Land Economics 3(3,0)S A study of the characteristics of land and of the physical, legal, social and economic principles and problems relating to the control and use of land resources. *Preq:* AGEC 202 or ECON 200.

406 Seminar 1(1,0) An examination of the relation of economics and sociology to specific problems. *Preq:* Senior standing.

409, 609 Agribusiness Organization 3(3,0) An examination of the organization of the agribusiness sector of the U.S. economy. Emphasis is placed upon the structure of the agricultural industries, the intra- and inter-firm conduct of agribusiness, and the technical and pricing efficiency of the agricultural sector. *Preq:* AGEC 319.

413, 613 Rural Property Appraisal 3(3,0) A study of the principles and procedures of appraising rural properties. Attention will be focused on types of appraisal approaches and economic factors considered in appraising rural properties. *Preq:* ACCT 200 or 201, AGEC 202 or ECON 211.

452, H452, 652 Agricultural Policy 3(3,0)F A review of public agricultural policy programs in the United States and a critical examination of current and proposed government policies and programs affecting the agricultural sector of the economy. Included are economic considerations as related to past and current farm price and income problems. *Preq:* AGEC 302 and 309.

456, H456, 656 Prices 3(3,0)S A review of the basic theory of price under competitive conditions and various modifications; nature, measurement and causes of daily, seasonal and cyclical price fluctuations; geographical price relationships; nature, function and behavior to future markets; government price programs. *Preq:* AGEC 308, ECON 314, EXST 462.

460, 660 Agricultural Finance 3(3,0)F The study of the principles and techniques of financing in the agricultural sector. Topics include the capital situation in agriculture, concepts of farm financial management, use of credit, capital markets, lending agencies, and estate planning. *Preq:* ACCT 200 or 201, AGEC 202.

719 Professional Problems in Agribusiness Management 3(3,0)

791 Selected Topics in Agricultural Economics 1-3 (1-3,0)

802 Advanced Production Economics 3(3,0)

805 Seminar in Marine Resources Management and Policy 3(3,0)

806 Applied Regional Economics 3(3,0)

807 Market Structure in Agricultural Industries 3(3,0)

808 Applied Quantifications in Agricultural Economics 3(3,0)

809 Advanced Natural Resource Economics 3(3,0)

810 Water and Marine Resources Management and Policy 3(3,0)

814 Contemporary Public Policy 3(3,0)
827 Advanced Agricultural Consumption and Demand 3(3,0)
851 Seminar in Research Methodology 1(1,0)
881 Internship in Community and Resource Development 1-6
891 Master's Research. Credit to be arranged.
904 Seminar in Resource Economics 3(3,0)
906 Seminar in Area Economic Development 3(3,0)
907 Agricultural Marketing Problems 3(3,0)
991 Doctoral Research. Credit to be arranged.

AGRICULTURAL EDUCATION (AGED)

Professors: E. T. Carpenter, Head; J. A. Hash, J. H. Rodgers; Associate Professor: L. H. Blanton; Assistant Professor: J. H. Daniels

100 Orientation and Field Experience 1(0,2) Supervised observations and explanations of vocational agriculture teaching while serving as teacher aides. One full week of field experience in representative high schools is required.

200 Supervised Field Experience I 1(0,3) Actual participation in vocational agriculture teaching activities plus conferences with local supervising teachers and college supervisors. One full week of field experiences in specialized high school programs or area vocational centers is required.

201 Introduction to Agricultural Education 3(2,3) F Principles of education, development of agricultural education, and an introduction to the formulation of instructional programs for the teaching of agricultural courses.

300 Supervised Field Experience II 1(0,3) Special emphasis is placed on filling gaps in existing knowledge and experiences of the students. The primary focus will be on becoming acquainted with the student teaching center well in advance of the customary eight-week directed teaching experience.

401, 601 Methods in Agricultural Education 3(2,3) S Appropriate methods of teaching vocational agriculture in high schools. The course includes procedures for organizing teaching programs, teaching high school students, and directing F.F.A. activities.

406 Directed Teaching 6(0,18) S Guided participation in the professional responsibilities of a teacher of vocational agriculture including an intensive study of the problems encountered and the competencies developed. A half semester of directed teaching in selected schools is required. 

423, 623 Curriculum 2(2,0) S Curriculum goals and related planning for career and continuing education programs.

425, 625 Teaching Agricultural Mechanics 2(1,3) S Organizing course content, conducting and managing an agricultural mechanics laboratory, shop safety, microteaching demonstrations of psychomotor skills, and methods of teaching manipulative abilities.

431, 631 Methods in Environmental Education 3(3,0) S A study of various techniques appropriate for teaching environmental education. Instruction is applicable to elementary, high school, and adult-level teachers. Offered in Summer School only.

450, 650 Modern Topics and Issues 3(3,0) A major area of concern to teachers of agriculture and county agents will be selected for intensive study at least one semester prior to offering the course. Team teaching with faculty from other departments in the College of Agricultural Sciences will be utilized when feasible. 

465, 665 Program and Curriculum Development 3(3,0) F, Even-numbered years. Each student will determine needs and resources in a specific community and plan a program and
curriculum to meet these needs. Instruction is appropriate for agricultural, extension, and vocational personnel.

467, 667 Adult Education in Agriculture 3(2,3)S. Odd-numbered years. Principles and practices appropriate to the solution of problems encountered in instructional programs for adult farmers.

726 Agricultural Mechanization for Inservice Teachers 3(3,0)
727 Agricultural Education Shop Management 3(1,6)
736 Internship: Teaching 3(1,6)
737 Internship in Agribusiness Firms 3(1,6)
803 Evaluation of Instructional Programs 3(2,3)
804 Special Problems 3(2,3)
805 Administration and Supervision in Agricultural Education 3(3,0)
815 Teaching Agricultural and Power Mechanics 3(2,3)
820 Teaching Young Farmers 3(3,0)
825 Supervision of Student Teaching 3(3,0)
869 Seminar 1-3(1-3,0)
889 Introduction to Research in Education 3(3,0)

AGRICULTURAL ENGINEERING (AGE)


181 Agricultural Engineering Concepts 1(0,3)S This course utilizes computers and basic engineering concepts to solve typical agricultural engineering problems. Tours, guest speakers, and films are used to acquaint the student with problems in engineering practice. The topics covered prepare the student to use the computer in subsequent courses. Preq: ENGR 180 or consent of instructor.

212 Fundamentals of Mechanization 3(2,3)S Functional analysis of selected agricultural equipment and the economic performance of machine systems; also, the utility and principles of applied technology and processes essential to providing a background for engineering design, research and development. Preq: EG 109.

221 Soil and Water Resources Engineering I 3(2,3)F Physical relationships of factors governing rainfall disposition are used as bases for defining the hydrology of agricultural watersheds. The surveying necessary for design and application of resource management measures and structures is taught. Preq: MTHSC 106.

353 Computational Systems 2(1,3) Digital and analog techniques are used to solve agricultural engineering problems, including simulation of biological systems. Hybrid and advanced digital computational methods are studied. Preq: ENGR 180, MTHSC 208.

355 Engineering Analysis and Creativity 2(1,3) The creative and analytical portions of the engineering design process are developed in a problem approach. Application of physical and mathematical principles, analytical and experimental modeling and intelligent assumption making are stressed. Students are also introduced to the techniques of systems analysis. Preq: MTHSC 208, PHYS 221.

362 Energy Conversion in Agricultural Systems 3(2,3)S The energy requirements of agricultural systems with emphasis upon energy conversion methods. Characteristics of various sources of energy will be considered including economic aspects. The present energy conversion mechanisms used in agriculture will be studied and their limitations considered. Preq: ME 311.
364 Agriculture Waste-Management Systems 2(2,0) The course will include planning and
design of waste-management systems which employ physical, biological, and chemical pro-
cesses for the treatment and utilization of agricultural wastes. Solid, liquid, and gaseous wastes
are considered. Presentation is relevant to current agricultural practices and legal and social
restraints.

416 Agricultural Machinery Design 3(2,3)S Engineering analysis of machines and basic
agricultural operations and systems requiring machine functions. Fundamentals of machine
design with applications to agricultural machinery. Velocity and acceleration, analyses, dimen-
sion determination, power transmission, and vibrations in machinery are studied. Preq: EM 304.

422 Soil and Water Resources Engineering II 3(2,3)S Basic soil-water-plant relationships
are used to establish criteria for the analysis and design of facilities and structures for conser-
vation, water control, drainage and irrigation. Engineering relationships involved in the design
of such facilities are emphasized. Preq: AGE 221, AGRON 202, EM 320, or consent of instructor.

431, 631 Agricultural Structures Design 3(2,3)F Analytic and synthetic design of building
components, including fastening devices, as determined by both live and dead loads with
emphasis on statically determinant members and their positions and utilization in frames and
trusses. Major materials considered are wood, steel, and concrete. Coreq: EM 304.

433, 633 Design Criteria for Plant and Animal Environment 2(2,0) This course evaluates,
develops, and interprets criteria for the environmental design of selected agricultural production
facilities by studying environment as it relates to the physiology of plants and animals. Simulation
of physiological systems will be emphasized. Preq: Course in animal science or plant science
or consent of instructor.

442 Agricultural Process Engineering 3(2,3)S Design of unit operations components used
in agricultural processing. Engineering principles and instrumentation as applied to control sys-
tems, heat transfer, materials handling, storage and related subjects are emphasized. Preq:
E&CE 307, EM 320, ME 311.

465 Engineering Properties of Biological Materials 2(1,3)S The thermal, electrical, me-
chanical, and chemical characteristics of biological materials, organisms, and metabolic pro-
cesses are studied in relationship to engineering analysis and synthesis. The effects of environ-
mental factors imposed by engineering processes are evaluated. Preq: AGE 353.

471 Research I 1(0,3) This course is designed to acquaint senior students in Agricultural
Engineering with the scientific method through execution of an independent research project.
Selection of a research topic, a thorough literature review, and detailed and analytical investiga-
tion will be required. Preq: Senior standing in Agricultural Engineering or other engineering
curricula.

472 Research II 1(0,3) Continuation of AGE 471. Students will complete their research pro-
jects with experimental verification of the analytical model developed in previous course. A formal
report and an oral presentation of results are required. An introduction to real-world engineering
problems will be accomplished through guest lecturers. Preq: AGE 471.

473, H473 Special Topics in Agricultural Engineering 3(3,0) A comprehensive study of
special topics in the field of agricultural engineering not covered in other courses. Special
emphasis will be placed on independent pursuit of detailed investigations.

781 Special Problems 1-3
811 Tillage and Soil Dynamics 3(3,0)
822 Water Movement in Soils 3(3,0)
865 Heat and Moisture Transfer in Biological Materials 3(3,0)
871 Selected Topics in Agricultural Engineering 1-3
882 Systems Engineering 3(2,3)
891 Master's Research. Credit to be arranged.
991 Doctoral Research. Credit to be arranged.

AGRICULTURAL MECHANIZATION (AGM)


205 Principles of Farm Shop 3(2,3) Principles, techniques, and methods in the selection, proper use and maintenance of hand and power tools. Principal topics include welding, tool fitting, metalwork, woodworking, finishing and preserving, pipe fitting, and farm masonry.

206 Agricultural Mechanization 3(2,3) The agricultural student is taught to apply physical principles and sound reasoning to the mechanization of modern agricultural production and processing enterprises. Planning efficient operational systems and wise selection of equipment, based on function and economic suitability are stressed. Preq: MTHSC 105, PHYS 207.

301 Soil and Water Conservation 3(2,3) Water management in agriculture is studied by applying principles of elementary surveying, mathematics and fluid flow as related to soil-water-vegetation complexes in erosion control, conservation, drainage, and irrigation.

302 Rainfall, Runoff, and Erosion Control 3(2,3) Precipitation causes, characteristics, and distribution are covered. Resulting runoff rates and volumes as influenced by watershed characteristics are studied, including methods of controlling runoff and erosion by vegetative and mechanical means. Sufficient elementary surveying is included to assure proper application of principles in the design of soil and water conservation practices. Not open to students who have completed AGM 301.

303 Calculations for Mechanized Agriculture 3(2,3) Course designed to enhance the student's ability to analyze and solve a wide range of problems requiring engineering technology. Laboratory periods will be used to introduce the student to microcomputer hardware, Basic programming, and typical applications to agricultural mechanization problems.

402, 602 Drainage, Irrigation, and Waste Management 3(2,3) Continuation of AGM 302. Basic soil-water-plant relationships are used to determine the need for and methods of irrigation, drainage, and waste management. Topics covered will include irrigation methods, drainage needs, drainage methods, and waste-treatment methods. Preq: AGM 302.

404 Farm Structures 3(2,3) Farmstead planning, including space and environmental needs for livestock and poultry. Additional topics include elements of crop processing, materials handling, and animal waste disposal.

406, 606 Mechanical and Hydraulic Systems 3(2,3) This course deals with power transmission systems for agricultural production with emphasis on mobile equipment. The characteristics, requirements, and design of both V-belt drives and roller-chain drives are presented. Emphasis is placed on hydraulic power transmission systems, including pumps, actuators, control devices, and hydraulic circuitry. Preq: AGM 206 or consent of instructor.

408 Equipment Sales and Service 3(3,0) Agricultural equipment sales and service techniques, inventory and accounting procedures followed by the farm machinery industry.

452, 652 Farm Power 3(2,3) A study of tractors with emphasis upon internal combustion engine principles and the support systems necessary for its proper functioning. The application of power, maintenance, adjustment, and general repair are also considered.

460, 660 Farm and Home Utilities 3(2,3) A course for undergraduate and graduate students in Agriculture and related curricula, involving a study of electric and other utilities on the farm and in the home. Selection, installation, and maintenance of wiring systems, lighting systems, motors, controls, water systems, and waste disposal systems are emphasized. Preq: Junior standing.
472 Seminar 1(1,0) The student will be introduced to the agribusiness world, professionalism, current topics of special interest, and financial and legal implications of modern agricultural production. **Preq:** Senior standing in Agricultural Mechanization and Business or consent of instructor.

712 Farm Machinery Management 3(2,3)

733 Analysis of Agristuctures 3(3,0)

771 Selected Topics in Agricultural Mechanization 1-3(1-3,0)

781 Special Problems 1-3(1-3,0)

851 Simulation of Agricultural Systems 3(3,0)

**Agriculture (AGRIC)**

**Professors:** B. D. Barnett, G. R. Craddock, O. J. Dickerson, J. E. Faris, S. B. Hays, J. C. Hite, M. W. Jutras, J. T. Lazar, Jr., T. L. Senn, B. J. Skelton, R. F. Wheeler, J. R. Woodruff; **Associate Professor:** J. C. McConnell, Jr.; **Assistant Professor:** D. R. Sloan

**103 Introduction to Animal Industries 3(2,3)** F, S Fundamental and descriptive aspects of the animal industries as applied biology and major segments of food production and distribution systems. The subject matter will be presented by Animal Science, Dairy Science, and Poultry Science Departments.

**104, H104 Introduction to Plant Sciences 3(2,3)** F, S A fundamental course in plant sciences, including agronomic and horticultural crops of the major agricultural areas of the world and emphasizing the crops of South Carolina. The laboratory exercises are self-tutorial.

**301 International Agriculture 3(3,0)** F This course is designed to acquaint the student with the systems of agriculture of the world. The approach is evolutionary. Main emphasis is on production as related to world climates and world population. Various geographical areas are considered. **Preq:** AGEC 202 or ECON 211.

**401 International Agriculture Seminar 1(1,0)** S A colloquium of current issues in world agriculture. Topics include population growth, food policy, technology transfer, and international trade. With permission of instructor, the course may be repeated for a total of two credits.

**H491 Senior Honors Research 3(1,6)** Senior Division Honors research in an agricultural sciences curriculum. Open to approved Honors Program students only. In consultation with and under the direction of a professor, the student will select a research topic, conduct experiments, record data, and make an oral presentation of results to the College Honors Program Committee.

**H492 Senior Honors Research 3(1,6)** Continuation of AGRIC H491. Senior Division Honors research in an agricultural sciences curriculum. Upon termination of the research project, the student will submit a formal written report and make a final oral presentation of results to the College Honors Program Committee. Professor-student discussions of additional topics will be arranged.

**Agronomy—Crops and Soils (AGRON)**

**Professors:** G. R. Craddock, **Head:** B. J. Gossett, W. D. Graham, Jr., C. M. Jones, U. S. Jones, M. W. Jutras, K. S. LaFleur, J. A. Martini, E. A. Rupert, H. D. Skipper, J. R. Woodruff; **Associate Professors:** E. B. Eskew, E. F. McClain, V. L. Quisenberry, J. S. Rice, B. R Smith; **Lecturer:** P. B. Gibson

**202 Soils 3(2,2)** F, S An introduction to world land resources, soil formation, classification, and mineralogy. Emphasis is placed upon the basic chemical and physical properties of soil. Soil microorganisms, plant nutrients, and fertilization are discussed. Soil properties are related to plant growth. **Preq:** CH 101, 102, or a geology sequence including GEOL 101, or consent of instructor.
172 Description of Courses

301, 601 Fertilizers 3(3,0) Production, marketing, and use of minerals and chemicals that are sources of elements essential for plant growth. How these elements are taken by roots from the soil and converted to plants for food, fiber, shelter, and ornamentals will be discussed.

350 Practicum 1-3 Preplanned internship undertaken with an approved agency concerned with agronomic practices. Restricted to students with a major or minor in Agronomy. Maximum of three credits allowed. Preq: Consent of department head.

402, 602 Land Pollution Control 3(3,0)S, Odd-numbered years. Application of the principles of soil science to the use of land for disposal of pollutants and wastes from an increasing population of animals, plants, and man. Waste utilization, waste disposal methods, and capacity of land to consume wastes will be discussed. Preq: AGRON 202. 403, or consent of instructor.

403, 603 Soil Genesis and Classification 2(1,3)F Presentation of the processes and factors involved in the genesis and morphology of soils; study of soil classification; practical field problem of soil mapping. Preq: AGRON 202 or consent of instructor.

404, 604 Soils and Land Use 2(1,3)F Soils interpretations for nonagricultural purposes and facilities. Emphasis upon use of modern soil surveys and properties and features of soils important in nonfarm land uses. Not open to Agronomy majors.

405, 605 Plant Breeding 3(2,2)S, The application of genetic principles to the development of improved crop plants. Principal topics include the genetic and cytogenetic basis of plant breeding, mode of reproduction, techniques in selfing and crossing, methods of breeding, inheritance in the major crops, and biometrical methods.

406 Special Problems 1-2(0,3-6) Course designed to acquaint undergraduate students with the scientific method. Literature investigation, planning, and execution of an experiment are integral parts of the course. Not available to AGRIC H491 and H492 students. Maximum of 4 credits allowed. Preq: Senior standing as a major or minor in Agronomy and consent of department head.

407, 607 Principles of Weed Control 3(2,2)F Weeds, their introduction, ecology, methods of reproduction, dissemination, and control; chemistry and mode of action of herbicides, equipment and techniques of application; a characterization of the common weeds of the Southeast. Preq: AGRON 104, AGRON 202, or consent of instructor.

421, 621 Field Crops-Monocots and Specialty Crops 3(3,0) The principles involved in the production and utilization of corn, wheat, oats, barley, rye, sorghum, rice and the millets, with special emphasis on their importance in South Carolina agriculture. The role of other oil, fiber, seed, drug, sugar, and other crops will be treated from the standpoint of worldwide production and utilization. Preq: AGRON 104, AGRON 202.

422, 622 Field Crops—Dicots 3(3,0)S The principles involved in the production and utilization of cotton, soybeans, tobacco, and peanuts with special emphasis on their importance in South Carolina agriculture. Preq: AGRON 104, AGRON 202.

423, 623 Field Crops—Forages 3(3,0)S The characteristics, establishment, utilization, and maintenance of crops for hay, silage, and pasture. Crops valuable in South Carolina are emphasized. Preq: AGRON 104, AGRON 202, or consent of instructor.

424, 624 Advanced Field Crops Laboratory 1(0,2)S Identification and management of the important forage and row crops of the Southeast, nation, and the world. Course is self-tutorial. Preq: AGRON 104.

425, 625 Seed Science and Technology 3(2,2) Topics include seed development, germination, dormancy, pathology, storage, and deterioration. Seed testing and commercial production of seed are also covered. Emphasis will be placed on useful applications of current seed science knowledge. Preq: AGRON 104, BIOL 104.
Animal Physiology 173

452, 652 Soil Fertility and Management 2(2,0)S Principles of crop rotations, soil fertility, soil management, and other factors necessary for the practical utilization of soils. \textit{Preq:} AGRON 202 or consent of instructor.

453, 653 Soil Fertility Laboratory 1(0,3)S The evaluation and interpretation of soil fertility and plant nutrition by laboratory diagnostic methods used in the management of soils for crop production. \textit{Preq:} AGRON 202 or consent of instructor.

455 Seminar 1(1,0)F Student presentation of current agronomic topics of special interest in crop production appearing in recent scientific journals and other publications.

456 Seminar 1(1,0)S Student presentation of current topics of special interest in the field of soil science appearing in recent scientific journals and other publications.

475, H475, 675 Soil Physics and Chemistry 3(2,3)S A study of the principles of soil physics and chemistry and their applications. Topics include soil texture, structure, compaction, water relations, solute movement, mineral composition, adsorption phenomenon, and soil acidity. \textit{Preq:} AGRON 202, a course in sophomore chemistry and physics, or consent of instructor.

490, 690 Soil Organisms in Crop Production 3(2,3)F Interrelationships of soil organisms, soil properties, and crop production. Aspects of biological nitrogen fixation, mycorrhizae, and microbial-pesticide interactions. Biochemical and nutrient transformations related to plant growth. \textit{Preq:} AGRON 202, MICRO 305, PLPA 401, or consent of instructor.

801 Crop Physiology and Nutrition 3(3,0)
802 Pedology and Soil Classification 3(2,3)
804 Theory and Methods of Plant Breeding 3(3,0)
805 Soil Fertility 3(3,0)
806 Special Problems 1-3(0,3-9)
807 Soil Physics 4(3,3)
808 Soil Chemistry 3(2,3)
812 Crop Ecology and Land Use 3(3,0)
820 Pesticide Residues in the Environment 3(3,0)
825 Seminar 1(1,0)

891 Master’s Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

ANIMAL PHYSIOLOGY (ANPH)
(See courses listed under Animal Science, Dairy Science, Entomology, Poultry Science, and Zoology)


301 Physiology and Anatomy of Domestic Animals 3(2,3) A study of the physiology and associated anatomy of the body systems, including nervous, skeletal and muscular, respiratory, digestive, circulatory, urinary, reproductive, and endocrine systems. This course is designed primarily for students in Animal Science, Dairy Science, and Poultry Science. \textit{Preq:} BIOL 103, 104, 105, 106 or 110, 111.

460, H460, 660 Systems Physiology 4(3,3) Physiology of the endocrine, digestive, excretory, and reproductive systems. \textit{Preq:} ANPH 301, ZOOL 202, 340, 459, or consent of instructor.

801 Electron Microscopy of Biological Specimens 3(1,6)
174 Description of Courses

806 Experimental Animal Physiology 3(1,6)
807 Special Problems in Animal Physiology 1-3
808 Mammalian and Avian Endocrinology 3(3,0)
812 Digestive-Metabolic, Excretory and Respiratory Physiology 5(4,3)
814 Membrane, Cardiovascular and Neuro-Muscular Physiology 5(4,3)
851 Animal Physiology Seminar I 1(1,0)
852 Animal Physiology Seminar II 1(1,0)
991 Doctoral Research. Credit to be arranged.

ANIMAL SCIENCE (ANSC)

202 Introduction to Animal Science 3(2,3) This course deals with basic principles concerning the breeding, feeding, management, and marketing of beef cattle, swine, and horses. The laboratory is designed to demonstrate the basic elements of livestock breeding, feeding, and management. Beef cattle, swine, and horses will be used. Evaluation of slaughter animals and carcasses is included.

205 Light Horse Management 2(1,3) The light horse industry—development of breeds and their uses. Breeding, feeding, and management of light horses. Fundamental instruction in equitation.

301, H301 Feeds and Feeding 3(3,0) F,S Feed nutrients, digestion, metabolism of feedstuffs, feeding standards, and balancing of rations. Preq: ANSC 202 or equivalent, and CH 201, or consent of instructor.

303 Livestock Evaluation 2(1,3) This course is concerned with identification and determination of body traits that will ultimately affect the market grades and economic value of live animals and their carcasses. Preq: ANSC 202.

305 Meat Grading and Selection 2(1,3) F. Even-numbered years. Classification, grading and selection of beef, lamb and pork carcasses, and wholesale cuts; and factors influencing quality and value will be studied. Students enrolled in this course are eligible to compete in Intercollegiate Meat Judging Contests. Preq: ANSC 202.

306 Livestock Selection and Judging 2(1,3) S Selection and breed characteristics of beef cattle, sheep, swine, and horses will be studied. Livestock terms useful for livestock breeders will be used. Students enrolled in this course are eligible to compete in the Southeastern Intercollegiate Livestock Judging Contest. Preq: ANSC 202, 303.

351 Meat Identification and Utilization 1(0,3) Selection of meat and identification of cuts, processing techniques, nutritive value, meat preservation, research techniques, muscles, and bones.

353, H353 Meats 2(2,0) F The chemical and physical composition of meat, meat hygiene, nutritive value, curing, freezing, and meat by-products. Preq: ANSC 202.

355 Meats Laboratory 1(0,3) F The selection and grading of meat animals and carcasses. Practical work in slaughtering of animals and in the cutting, curing, and freezing of meats. Emphasis is placed on the identification of wholesale and retail cuts. Preq: ANSC 202.

401, H401, 601 Beef Production 3(3,0) F Breeding, feeding, management, and grading of beef cattle. Emphasis is placed on year-round grazing. Preq: ANSC 301 or consent of instructor.

403, H403, 603 Beef Production Laboratory 1(0,3) F Practical application of beef production practices. Preq: ANSC 301 or consent of instructor.
405 Advanced Livestock Selection and Evaluation 1(0,3)F. Odd-numbered years. Continuation of ANSC 306 for students who are interested in participating in judging contests or in receiving special training in the selection of breeding cattle, sheep, and swine. Judging and grading of market classes are considered. Preq: ANSC 306.

406 Seminar 2(2,0)S Special problems in animal production. Each student is given a subject on which he makes weekly reports before a seminar group. Preq: ANSC 301 or consent of instructor.

408, H408, 608 Pork Production 3(3,0)S Feeding, breeding, management, and marketing of hogs. Emphasis is placed on winter and summer forages, protein supplements, mineral mixtures, and sanitation practices. Preq: ANSC 301 or consent of instructor.

410, H410, 610 Pork Production Laboratory 1(0,3)S Practical application of swine production practices are demonstrated. Grading, selection, feeding, management, and care of swine are given attention. Preq: ANSC 202 or consent of instructor.

412, H412 Horse Science 3(2,3) Anatomy and physiology of the horse, emphasizing nutrition, reproduction, genetics, and management. Selection, unsoundness, parasites, and diseases are discussed. Preq: ANSC 202 or consent of instructor.

452, H452, 652 Animal Breeding 3(3,0)S The fundamental principles relating to the breeding and improvement of livestock including variation, heredity, selection, line-breeding, inbreeding, crossbreeding, and other related subjects. Preq: GEN 302.

802 Topical Problems 1-3(1-3,0)

803 Meat Technology 3(3,0)

804 Methods in Animal Breeding 3(3,0)

805 Nutrition of Meat Animals 3(3,0)

891 Master's Research. Credit to be arranged.

ARCHITECTURAL STUDIES

ARCHITECTURE (CAAR)


421 Architectural Seminar 3(3,0) Lectures and seminars dealing with pertinent topics related to environmental and technological considerations in architecture and the building industry. Preq: Senior standing or consent of instructor.

424, 624 Furniture and Industrial Product Design 3(1,4,1) The course will cover the design of furniture, special products or a product system for interior and exterior spaces. There will be opportunities for indepth studies offered in ergonomics, interior design, and urban space object design. Preq: CADS 352.

425, 625 Energy Criteria for Architectural Design 3(3,0) Course will investigate current consumption trends in energy and their impact on the design professions. Methods of energy-conscious design will be highlighted and the influence on regional climatic architectural and planning solutions will be studied. Preq: CABS 304, CADS 352.

481, 681 Architectural Office Practice 3(3,0) General consideration of architectural office procedure. Study of the professional relationship of the architect to client and contractor, including problems of ethics, law, and business. Preq: Consent of instructor.

485, 685 Health Care Delivery Systems and Health Care Facilities Seminar 3(3,0) This course introduces the concepts, organization, and direction of health and health-care services
within the context of health-care delivery systems. Special emphasis is placed on mental and physical health-care facilities concepts. \textit{Preq:} Consent of instructor.

\textbf{488, 688 Health Care Facilities Programming Techniques} 3(2,3) Seminar on recent research and innovations in health-care facilities programming, and original investigation of assigned programming problems. \textit{Preq:} Consent of instructor.

\textbf{490 Directed Studies} 1-5 Comprehensive studies and research of special topics not covered in other courses. Emphasis will be placed on field studies, research activities, and current developments in architecture. \textit{Preq:} Consent of department head.

\textbf{557 Architectural Design} 9(3,18) City planning design and the development of complex building solutions. \textit{Preq:} Admission to the Bachelor of Architecture program.

\textbf{558 Architectural Design} 9(3,18) The programming and solution of complex building design problems including interior and site development. \textit{Preq:} CAAR 557.

\textbf{559 Terminal Project in Architecture} 9(1,24) The student will select an appropriate architectural problem, conduct adequate research, prepare a comprehensive program, and make a complete oral, written and visual presentation of his solution. \textit{Preq:} CAAR 558.

\textbf{801 Professional Practice Seminar} 3(3,0)

\textbf{853 Architectural Design} 6-9(0,18-27)

\textbf{854 Architectural Design} 6-9(0,18-27)

\textbf{857 Architectural Design} 9(0,27)

\textbf{858 Preliminary Thesis or Terminal Project} 3(1,6)

\textbf{859 Terminal Project} 1-12(0,3-36)

\textbf{886 Health Care Facilities Components and Functions} 3(2,3)

\textbf{890 Directed Studies} 1-5

\textbf{891 Architectural Thesis} 1-12

\textbf{ARCHITECTURE OVERSEAS PROGRAM (CA)}

\textit{Professor:} C. Fera

At the Overseas Center for Building Research and Urban Study in Genoa, Italy, courses are offered to fifth-year students in Architecture, City and Regional Planning, and Visual Arts and fourth-year students in Building Science and Management.

\textbf{412, 612 Directed Research in Architectural History} 3(1,6) Original investigations and research related to specific historic structures; studies may include measured drawings, restoration, and proposals for adaptive use. Required course for all participants of the Overseas Program. \textit{Preq:} Postgraduate or graduate standing in the College of Architecture, Senior standing in Building Science and Management, or acceptance in the Bachelor of Architecture program.

\textbf{420, 620 Visual Studio} 3(0,9) Field drawing and sketching and other documentation of important European architectural and landscape subjects. The course content will include gallery visits and adjunct lectures. (May be substituted for one semester of undergraduate or graduate visual arts studio.) \textit{Preq:} Postgraduate or graduate standing in the College of Architecture, Senior standing in Building Science and Management, or acceptance in the Bachelor of Architecture program.

\textbf{442, 642 Building Science Studio} 1-9(0-3,3-18) Comparative studies of European and American methods of building construction and construction management and may include appropriate construction drawings. (May be substituted for CABS 403 and 442. If taken during Summer Sessions, it may be substituted for other courses as approved.) \textit{Preq:} Senior standing in Building Science and Management.
550 Architectural Studio 1-9(3,18) Comprehensive architectural studio programs for central city structures. Problems will be related to other studio project areas concurrent in Overseas Center. (May be substituted for CAAR 557, 558. Limited to Bachelor of Architecture degree candidates or postgraduates.) Preq: Postgraduate standing in the College of Architecture or acceptance in the Bachelor of Architecture program.

850 Architectural Studio 1-9(0-3,3-18)

860 Planning Studio 1-9(0-3,3-18)

880 Visual Arts Studio 1-9(0-3,3-18)

ART AND ARCHITECTURAL HISTORY (CAAH)

Professors: J. T. Acorn, Head; H. N. Cooledge, Jr.; Associate Professor: E. C. Voelker; Assistant Professor: J. B. Mulholland; Adjunct Professor: R. D. England

115 History of Art and Architecture I 3(3,0) Total environment: its demands and restrictions as evidenced by the building and planning of men from ancient times to the present.

116 History of Art and Architecture II 3(3,0) Continuation of CAAH 115. Preq: CAAH 115.

215 History of Art and Architecture III 3(3,0) Cultural focus: its problems and expression as evidenced by selected examples of architecture and planning from ancient times to the present, considered in depth. Preq: CAAH 116.


303 Evolution of Visual Arts I 3(3,0) A consideration of man's necessity for and development of the visual arts in the Western World from ancient times to the Renaissance. Illustrated lectures and collateral reading.

304 Evolution of Visual Arts II 3(3,0) Development and utilization of the visual arts in the Western World from the Renaissance through modern times; illustrated lectures and collateral reading.

305 Man and the Built Environment 3(3,0) Review of roots of contemporary architecture and current problems that face man individually and socially in the built environment. The course will consist of lectures, special projects and reports, and selected readings in historical and contemporary design influence. (Not open to Design majors.)

403, 603 History of Modern Architectural Movement 3(3,0) A seminar in the analysis and criticism of architectural and town building works. The course sequence will include historic and contemporary examples, literary searches, field trips, essays, and oral reports. Preq: Senior standing or consent of instructor.

404, 604 Current Directions in Architecture 3(3,0) The critical analysis of the development and current directions of modern movements in architecture. Preq: Senior standing or consent of instructor.

405, 605 History of Planning and Cities 3(3,0) This course is intended to familiarize professional students in the environmental design disciplines concerning the origin, development, and growth of cities to enable them to understand the ever accelerating growth of urbanism and the increasing complexity of urban organism. Preq: Consent of instructor or department head.

411, 611 Directed Research in Art and Architectural History 3(3,0) Comprehensive studies and research of special topics not covered in other courses. Emphasis will be placed on field studies, research activities, and current developments in art history.

412, 612 Directed Research in Art and Architectural History 3(3,0) Continuation of CAAH 411.

413, 613 Twentieth Century Visual Arts 3(3,0) A consideration of the visual arts in the 20th century in relation to the factors that have influenced the artist and the consequence of his/her production to society.
417, 617 Studies in the Art and Architecture of the Ancient World I 3(3,0) Consideration of the visual arts and architectural monuments of the Ancient World (Egypt, the Near East, Greece, and Rome) with a study in depth of selected examples from the period. Preq: CAAH 216 or consent of instructor.

418, 618 Studies in the Art and Architecture of the Ancient World II 3(3,0) A consideration of the visual arts and architectural monuments of the Ancient World (Egypt, the Near East, Greece, and Rome), with a study in depth of selected examples from the period. Preq: CAAH 417.

419, 619 Studies in the Art and Architecture of the Early Middle Ages 3(3,0) A consideration of the visual arts and architectural monuments of the Early Middle Ages (Byzantium and Western Europe from the 4th through 12th centuries), with a study in depth of selected examples from the period. Preq: CAAH 216 or consent of instructor.

420, 620 Studies in the Art and Architecture of the Late Middle Ages 3(3,0) A consideration of the visual arts and architectural monuments of the Late Middle Ages (Western Europe from the 12th through the 15th centuries), with a study in depth of selected examples from the period. Preq: CAAH 419.

423, 623 Studies in the Art and Architecture of the Renaissance I 3(3,0) A consideration of the visual arts and architectural monuments of the Renaissance (Western Europe from the 15th through the 18th centuries), with a study in depth of selected examples from the period. Preq: CAAH 216 or consent of instructor.

424, 624 Studies in the Art and Architecture of the Renaissance II 3(3,0) A consideration of the visual arts and architectural monuments of the Renaissance (Western Europe from the 15th through the 18th centuries), with a study in depth of selected examples from the period. Preq: CAAH 423.

427, 627 Eighteenth Century Visual Arts 3(3,0) A consideration of the visual arts: sculpture, painting, graphics, and furnishings of the 18th century in its environment, together with its precursors and later influence (1785-1815). Preq: CAAH 216.

428, 628 Nineteenth Century Visual Arts 3(3,0) A consideration of the visual arts of the 19th century: painting, sculpture, printmaking, ceramics, and so forth, in relation to the factors that have influenced the artist and his/her consequence on society. Preq: CAAH 427.

429, 629 Studies in the Art and Architecture of India and the Far East 3(3,0) A consideration of the visual arts and architectural monuments of India and the Far East, with a study in depth of selected examples from the period. Preq: CAAH 216 or consent of instructor.

815 Art and Architectural History Seminar I 3(3,0)
816 Art and Architectural History Seminar II 3(3,0)

BUILDING SCIENCE (CABS)


201 Building Science 3(2,3) A study of skills required for the application of building science technology including structural concepts, methods and materials, and environmental systems. Preq: MTHSC 106.

202 Building Science 3(2,3) A study of skills required for the application of building science technology including structural concepts, methods and materials, and environmental systems. Preq: CABS 201.

241 Construction Management I 5(3,6) Through the fall 1980.
242 Construction Management II 5(3,6) Through the spring 1981.
303 Building Science 3(3,0) Theory and design of simple determinate steel and wood structures with an emphasis on the conceptual understanding of structural systems. *Preq:* CABS 202.


311 Contract Documents 3(3,0) Introduction to working drawings, specifications and the various documents required to carry out a typical construction project. *Preq:* Junior standing.

312 Construction Feasibility Studies 3(3,0) A study of risk costs and return as factors impinging upon the feasibility of construction projects. *Preq:* ECON 305.

341 Construction Management III 5(3,6) Through the fall 1981.

342 Construction Management IV 5(3,6) Through the spring 1982.


352 Construction Management II 3(0,9) Analysis of construction projects with emphasis on estimating, scheduling, and resource leveling. *Preq:* CABS 311, 351.

403 Building Science 3(3,0) Theory of illumination for the built environment. Basic theory of fire protection and life safety in buildings. Design concepts for building energy conservation.

404 Building Science 3(3,0) Theory and design of simple reinforced concrete structures with an emphasis on the conceptual understanding of structural systems. *Preq:* CABS 303.

411 Construction Equipment 3(3,0) Selection, financing, and management of construction equipment. *Preq:* CABS 312.


432, 632 Construction Management V 3(3,0) Through the spring 1983.

441 Construction Management VI 5(3,6) Through the spring 1983.

442 Construction Management VII 5(3,6) Through the spring 1983.

451 Construction Management III 3(0,9) Study of labor-management relations in the construction industry, field organization, subcontractor relationships, supervision, safety, and productivity. *Preq:* CABS 352.

452 Construction Management IV 3(0,9) Study of construction business organization, policy, financial management, project management, and cost control. *Preq:* CABS 451.

461, 661 Construction Economic Seminar 3(3,0) Studies in urban and building economics.

471, 671 Architectural Structures 3(3,0) The examination and evaluation of structural systems with emphasis on the compatibility and constraints exerted on architectural design goals. *Preq:* CABS 404.

472, 672 Architectural Structures 3(3,0) Continuation of CABS 471. *Preq:* CABS 471.

475, 675 Building Equipment and Systems 3(3,0) The investigation of special topics in mechanical, electrical, illumination, and acoustical systems for buildings. *Preq:* CABS 304.

476, 676 Design for Natural Hazards 3(3,0) Basic principles of design for natural hazards to the built environment. Wind (hurricane, tornado, cyclone); water (flood, seiche, tsunami); seismic (shaking, faulting, landslide, liquefaction); and fire (vegetation, exposing structures, lightning). Weather characteristics and geological conditions, site and land-use planning, and hazard forces and hazard-resistant design fundamentals. *Preq:* CABS 403.
490 Directed Studies 1-5 Comprehensive studies and research of special topics not covered in other courses. Emphasis will be placed on field studies, research activities, and current development in building science. \textit{Preq:} Consent of instructor.

\textbf{INTERDISCIPLINARY STUDIES (CADS)}

151 Design Studies 4(2,6) An introduction to concepts and principles of architecture, construction, and visual arts through lectures, demonstrations, and studio exercises.


251 Design Studies 5(0.15) Studio work with adjunct demonstrations and lectures concerned with basic architectural design problems. \textit{Preq:} CADS 152 or consent of instructor.

252 Design Studies 5(0.15) Continuation of CADS 251. \textit{Preq:} CADS 251.

351 Design Studies 5(0.15) Studio work with adjunct demonstrations and lectures concerned with intermediate architectural design problems. \textit{Preq:} CADS 252.

352 Design Studies 5(0.15) Continuation of CADS 351.

451 Design Studies 5(0.15) Studio work with adjunct demonstrations and lectures concerned with advanced architectural design problems. \textit{Preq:} CADS 352.

452 Design Studies 5(0.15) Continuation of CADS 451.

\textbf{PLANNING STUDIES (CAPL)}

\textit{Professor:} E. L. Falk, \textit{Acting Head;} \textit{Assistant Professors:} J. R. Caban, M. A. Clark, O. Enserkal, B. C. Nocks, G. E. Varenhorst

411, 611 Introduction to City and Regional Planning 3(3.0) The purpose of the course is to introduce students from a variety of disciplines to City and Regional Planning. Spatial and nonspatial areas of the discipline will be explored through a wide-ranging lecture seminar program. \textit{Preq:} Consent of instructor or department head.

421, 621 Urban Social Structure 3(3.0) The social, economic, and political aspects of communities of varying sizes and types. Elements will include housing, education, recreation, social services, governmental structure and related community institutions. \textit{Preq:} Consent of instructor or department head.

472, 672 Implementation of the Local Planning Process 3(3.0) The organization and administration of types of planning agencies and private organizations. \textit{Preq:} Consent of instructor or department head.

473, 673 Government and Planning Law 3(3.0) Complete coverage of the laws and ordinances relating to redevelopment, subdivision control, zoning, official mapping, and other topics including interpretation, philosophy, enabling legislation and model ordinances. The legal basis of current and long-range planning policy will be discussed. \textit{Preq:} Consent of instructor or department head.

483, 683 Seminar on Planning Communication 3(3.0) Informal means open for plan implementation. The organization of effective public information and education programs, use of citizen advisory committees, and application of other implementation techniques. \textit{Preq:} Consent of instructor or department head.

812 City and Regional Planning Theory 3(3.0)

821 Intergovernmental Relations in the Planning Process 1-3(1-3.0)

822 Urban Systems and Design 3(3.0)

823 Social and Planning and Delivery Systems 3(3.0)

853 Comparative Studies in Planning Methods and Analysis 3(0.9)

854 Planning and Built Form Studies Studio 3(0.9)
858 Preliminary Planning Thesis 3(0.9)
859 Planning Terminal Project 3(0.9)
862 Citizen Participation in Planning 3(3.0)
863 Urban and Metropolitan Planning Studies Studio 3-6(0.9-18)
865 Advanced Landuse and Built Form Studies Studio 3-9(0.9-27)
871 Seminar on Planning and Management of Change 3(3.0)
881 Quantitative Methods and Urban Planning and Policy 3(3.0)
882 Seminar in Mathematical Modeling for Urban and Regional Planning 3(0.0-3)
883 Techniques for Analyzing Development Impacts 3(0.9)
884 Public Services and Facilities Planning 3(3.0)
885 City and Regional Financial Planning 3(3.0)
889 Selected Topics in Planning 3(3.0)
890 Directed Studies in City and Regional Planning 1-5(0.1-5)
891 Planning Thesis 3-9
893 City and Regional Planning Internship 6(0.6)

VISUAL ARTS (CAVA)


203 Visual Arts Studio 3(1,6) Studio work in visual elements and their organization, form, line, texture, space, light, and color. Principles of design and formal organization of visual arts.

205 Beginning Drawing 3(1,6) Studio work in drawing and related media. Preq: CADS 152 or CAVA 203.

207 Beginning Painting 3(1,6) Studio work in painting and related media. Preq: CADS 152 or CAVA 203.

209 Beginning Sculpture 3(1,6) Studio work in sculpture and related media. Preq: CADS 152 or CAVA 203.

211 Beginning Printmaking 3(1,6) Studio work in lithography, silk screen, woodcuts, and graphics and related media. Preq: CADS 152 or CAVA 203.

213 Beginning Photography 3(1,6) Studio work in photography and related media. Preq: CADS 152 or CAVA 203.

215 Beginning Graphic Design 3(1,6) Study and studio work with historical, contemporary, and experimental letter forms. Emphasis is placed on the application of letter design components to convey visual images and ideas beyond normal word and sentence formulation. Preq: CADS 152 or CAVA 203.

217 Beginning Ceramics 3(1,6) Applied studio work in ceramic hand building and pottery; creative experience in process of forming, decorating, glazing, and firing. Preq: CADS 152 or CAVA 203.

305 Drawing 3(1,6) Studio work in drawing and related media. Preq: CAVA 205.
307 Painting 3(1,6) Studio work in painting and related media. Preq: CAVA 207.
309 Sculpture 3(1,6) Studio work in sculpture and related media. Preq: CAVA 209.
311 Printmaking 3(1,6) Studio work in lithography, silk screen, etching, woodcuts and related media. Preq: CAVA 211.
313 Photography 3(1,6) Studio work in still photography and related media. Preq: CAVA 213.
315 Graphic Design 3(1,6) Study and studio work in layout, composition, illustration, investigation of studio skills; terminology and theories of layout and composition; emphasis on the different graphic formats and their use in advertising art. *Preq:* CAVA 215.

317 Ceramic Arts 3(1,6) Continuation of CAVA 217. *Preq:* CAVA 217.

405, 605 Drawing 3(0,9) Studio work in advanced drawing and related media. *Preq:* CAVA 305.

407, 607 Painting 3(0,9) Studio work in advanced painting and related media. *Preq:* CAVA 307.

409, 609 Sculpture 3(0,9) Advanced studio work in sculpture and related media. *Preq:* CAVA 309.

411, 611 Printmaking 3(0,9) Advanced studio in printmaking and related media. *Preq:* CAVA 311.

413, 613 Photography 3(0,9) Advanced studio work in photography. *Preq:* CAVA 313.

415, 615 Graphic Design 3(0,9) Utilization of graphic, scenic, and other visual design requirements for motion picture and television. Emphasis on imagination and use of visual design in relation to media and function: entertainment, documentary, institutional, or advertising. *Preq:* CAVA 315.

417, 617 Ceramic Arts 3(0,9) Advanced applied studio work in ceramic sculpture and pottery. *Preq:* CAVA 317.

490, 690 Directed Studies 1-5 Comprehensive studies and research of special topics not covered in other courses. Emphasis will be placed on field studies, research activities, and current developments in visual arts. *Preq:* Consent of department head.

850 Visual Arts Studio 3(0,9)
851 Visual Arts Studio 3-6
870 Visual Arts Studio 6(1,15)
871 Visual Arts Studio 3-6
880 Visual Arts Studio 3-15
891 Master's Research 3-15

**ASTRONOMY (ASTR)**

Professors: B. B. Bookmyer, J. R. Ray; Associate Professor: T. F. Collins; Assistant Professor: P. J. Flower

101 Solar System Astronomy 3(3,0) A descriptive survey of the universe, with emphasis on basic physical concepts and the objects in our solar system, is presented. Related topics of current interest will be included. For nonscience majors. This course may not be taken by a student who has completed ASTR 301.

102 Stellar Astronomy 3(3,0) A descriptive survey of the universe, with emphasis on basic physical concepts and galactic and extragalactic objects, is presented. Related topics of current interest will be included. For nonscience majors. This course may not be taken by a student who has completed ASTR 302.

103 Solar System Astronomy Laboratory 1(0,2) Optional laboratory to accompany ASTR 101. Demonstrations, laboratory exercises, planetarium visits, and a night laboratory, using a small telescope, will supplement the lecture course. *Coreq:* ASTR 101.

104 Stellar Astronomy Laboratory 1(0,2) Optional laboratory to accompany ASTR 102. Demonstrations, laboratory exercises, planetarium visits, and a night laboratory, using a small telescope, will supplement the lecture course. *Coreq:* ASTR 102.
208 Selected Topics in Modern Astronomy 3(3,0) Discrete topics of current interest to be selected by participants and lecturers from such areas as distance determination, pulsars, quasars, radio astronomy, current space program, instellar communication, meteorites, nucleosynthesis, variable stars, stellar evolution. Preq: One semester of astronomy or consent of instructor.

301 General Astronomy 3(3,0) Basic physical concepts necessary to an understanding of the objects in our solar systems are presented. Films, planetarium visits, and one observing session with a small telescope supplement the text. For physical science, mathematical sciences, or engineering majors. This course may not be taken by a student who has completed ASTR 101. Preq: MTHSC 106.

302 General Astronomy 3(3,0) Basic physical concepts necessary to an understanding of our stellar system and the observable universe beyond our galaxy are discussed. Films, planetarium visits, and one observing session with a small telescope supplement the text. For physical science, mathematical sciences, or engineering majors. This course may not be taken by a student who has completed ASTR 102. Preq: MTHSC 106.

307 Cosmology 3(3,0) A study of the large-scale structure of the universe. Discussion of experimental results includes optical, microwave, and radio observations. Evolutionary models which agree with current observations are discussed. Preq: ASTR 102.

401, 601 Stellar Atmospheres 3(3,0) Introduction to the theory of stellar atmospheres. Topics to be discussed include radiation laws, theory of continuum radiation and spectral line formation, radiation transfer, and stellar spectra. Applications to the sun and stars will be presented. Preq: ASTR 302 or consent of instructor.

402, 602 Stellar interiors and Evolution 3(3,0) Introduction to both the theoretical and observational approaches to the study of stellar evolution. The physical laws governing the temperature, pressure, and mass distributions in stars, including the equation of state, opacity and nuclear energy generation, will be described. Stellar evolution from pre-main sequence stars to post-red giant or supergiant stars will be studied. Preq: ASTR 302 or consent of instructor.

403, 603 Galactic Structure 3(3,0) Introduction to the kinematics, dynamics, and content of the Milky Way galaxy. Topics include galactic rotation and mass determination, galactic distance scale, stellar populations, galactic center, spiral structure, and evolution of the galaxy. Preq: ASTR 302 or consent of instructor.

412, 612 Practical Astronomy 3(3,0) Instruction in the techniques of data reduction and analysis, including discussions of instrumental and observational errors. Various methods of orbital solution will be applied to observations of visual, spectroscopic, and eclipsing binary systems. Preq: ASTR 302 or consent of instructor.

701 Solar System Astronomy for High School Teachers 3(3,0)
711 Stellar Astronomy for High School Teachers 3(3,0)
875 Seminar in Contemporary Astronomy 1-3(1-3,0)

BIOCHEMISTRY (BIOCH)

Professors: D. M. Henricks, G. L. Powell, J. M. Shively, Head; Associate Professors: D. R. Helms, J. K. Zimmerman; Assistant Professors: C. S. Brown, R. H. Hilderman, D. C. Speckhard; Visiting Assistant Professors: D. M. Gibson, V. A. Paynter

101 Molecules and Man 1(1,0) An introduction to the structure and function(s) or effect(s) of some biological molecules important to man. Preq: Limited to freshmen or by consent of instructor.

102 Molecules and Man 1(1,0) Continuation of BIOCH 101. Preq: Limited to freshmen or by consent of instructor.
210 Elementary Biochemistry 4(3,3) A discussion of the kinds of compounds found in living organisms, their biochemical reactions and significance. The laboratory work parallels classroom study. Preq: CH 102.

301 Molecular Biology 3(3,0) An introduction to the nature, production, and replication of biological structure at the molecular level and its relation to function. Preq: Organic chemistry.

302 Molecular Biology Laboratory 1(0,3) A laboratory to accompany Bioch 301. An introduction to fundamental laboratory techniques in biochemistry and molecular biology and a demonstration of some of the fundamental principles of molecular biology discussed in BIOCH 301. Preq: Organic chemistry. Coreq: BIOCH 301.

406, 606 Physiological Chemistry 3(3,0) The chemical basis of the mammalian physiological processes of muscle contraction, nerve function, respiration, kidney function, and blood homeostasis is studied. Composition of specialized tissue such as muscle, nerve, blood and bone, and regulation of water, electrolytes and acid-base balance is discussed. Preq: BIOCH 210 or organic chemistry.

408, 608 Physiological Chemistry Laboratory 1(0,3) Experiments will be conducted that illustrate biochemical methodology. The use of radioisotopes, chromatography, and procedures used in the clinical biochemical laboratory will be emphasized. Preq: Registration in BIOCH 406.

422, 622 A Physical Approach to Biochemistry 3(3,0) The study of chemical and physical properties of amino acids, lipids, nucleic acids, sugars and their biopolymers. Physical and mathematical analyses will be correlated with biological structure and function. Preq: Organic chemistry and one semester of physical chemistry.

423, 623 Principles of Biochemistry 3(3,0) The study of the chemistry of amino acids, monosaccharides, fatty acids, purines, pyrimidines and associated compounds leads to understanding of their properties and the relationship between structure and function that make them important in biological processes. The use of modern techniques is stressed. Preq: CH 224 or equivalent.

424, 624 Principles of Biochemistry 3(3,0) Continuation of BIOCH 423.

425, 625 General Biochemistry Laboratory 1(0,3) Experiments selected to illustrate current methods used in biochemical research.

426, 626 General Biochemistry Laboratory 1(0,3) Continuation of BIOCH 425.

491 Special Problems in Biochemistry 1-3(0,3-9) Orientation; i.e., experimental planning, execution, and reporting in biochemical research. Preq: Senior standing.

810 Advanced Biochemical Techniques 1-3(0,3-9)

815 Lipids and Biomembranes 3(3,0)

817 Chemistry and Metabolism of Hormones 3(3,0)

819 Regulation of Intermediary Metabolism 3(3,0)

820 Nucleic Acids and Protein Biosynthesis 3(3,0)

821 Proteins 3(3,0)

822 Enzymes 3(3,0)

824 Cellular Regulation at the Molecular Level 3(3,0)

831 Physical Biochemistry 3(3,0)

851 Biochemistry Seminar 1(1,0)

871 Advanced Topics 1-3(1-3,0)

891 Master’s Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.
BIOENGINEERING (BIOE)


233 Introduction to Engineering in Sports 3(3,0) Application of engineering concepts and methods to sports, including the design of sports equipment (e.g., Playing surfaces, helmets, pads, and shoes), biomechanical analyses of sports injuries, and rehabilitation. Preq: Sophomore standing or consent of instructor.

301 Engineering Aspects of Biology and Medicine 2(2,0) The relationships of various branches of engineering to biology and medicine. Structural engineering, fluid flow, and mass transfer in living systems. Artificial organs, biomaterials, implants, instrumentation, and other engineering challenges are discussed.

302 Biomaterials 2(2,0) Engineering testing and classification of biomaterials (stress, strain, viscosity, impact resistance, ductility, corrosion resistance, wear resistance); prostheses; artificial organs; effect of body environment on synthetic materials; methods for designing new materials. Preq: BIOE 301.

303 Artificial Organs 3(3,0) This course is designed to provide engineering, and biological and physical science students with an insight into the problems associated with replacing parts of the human body with artificial devices. Lectures will be supplemented with demonstrations, medical films, and field trips. Preq: Junior standing or consent of instructor.

320 Introduction to Structural Biomechanics 2(2,0) Introduction to the analysis of the mechanical function of the human body and the effect of external forces on the body. Includes movement of the musculo-skeletal system (e.g., walking) and effect of vibration and impact. Preq: BIOE 301.

401, 601 Computers for Bioscientists 1(1,0) Analog and digital simulation of biochemical and biological processes. Systems approaches, dynamic analysis, interactions between laboratory research and computer models. Preq: One semester of calculus or consent of instructor.

402, 602 Medical Applications of Engineering 3(3,0) A survey of the applications of physical principles to health science. Topics included are production and detection of X-rays, diagnostic radiology and radiation therapy, nature of radioactive emissions, relative biological effectiveness, nuclear medicine, radiation protection, surgical uses of lasers, cryogenics, cryobiology and cryosurgery, ultrasound, electrosurgery. Preq: General chemistry.


450, 650 Special Topics in Biomedical Engineering 1-4(0-4,12-0) A comprehensive study of a topic of current interest in the field of biomedical engineering. May be taken for credit more than one time. Preq: Consent of instructor.

800 Seminar in Bioengineering 1(1,0)

801 Biomaterials 3(3,0)

802 Research Techniques in Biomaterials Evaluation 3(1,6)

803 Polymers as Biomaterials 3(3,0)

820 Structural Biomechanics 3(3,0)

823 Artificial Cardiac Assistance and Replacement 2(2,0)
846 Elements of Bioengineering I 3(3,0)
847 Elements of Bioengineering II 3(3,0)
850 Special Topics in Biomedical Engineering 1-4(0-4,12-0)
870 Bioinstrumentation 3(2,2)
880 Applied Health Engineering Laboratory 1(0,3)
882 Experimental Surgery 3(1,4)
890 Internship 1-5(0,8-40)
891 Master’s Research. Credit to be arranged.
991 Doctoral Research. Credit to be arranged.

BIOLOGY (BIOL)
Associate Professor: D. R. Helms; Assistant Professors: R. A. Garcia, S. B. Miller, W. M. Surver, C. K. Wagner; Instructors: R. N. Holmes, M. V. Ruppert

103 General Biology I 3(3,0) The first course in a two-semester sequence on the fundamentals of biology. The course emphasizes the structural, molecular, and energetic basis of cellular activities and the classical and modern investigations that illustrate animals as functional units.

104 General Biology II 3(3,0) A continuation of BIOL 103 that emphasizes plants as functional units, the principles and mechanisms of evolution, diversity of organisms, and the principles of ecology. Preq: BIOL 103.

105 General Biology Laboratory I 1(0,3) A laboratory course that illustrates through experimentation, observation, and demonstration the structure and activities of cells and animals. The course is strongly recommended for students taking BIOL 103. Coreq: BIOL 103.

106 General Biology Laboratory II 1(0,3) A laboratory course that illustrates through experimentation, observation, and demonstration the structure and function of plants, some concepts of genetics, evolution, ecology, and the diversity of microbes, plants, and animals. The course is strongly recommended for students taking BIOL 104. Coreq: BIOL 104.

110 Principles of Biology I 5(4,3) An introductory course designed for students who major in biological disciplines of the College of Sciences. The course integrates lecture and laboratory and emphasizes a modern, quantitative and experimental approach to explanations of the structure, composition, dynamics, interactions, and evolution of cells, organisms, populations, and communities. Coreq: CH 101.


BOTANY (BOT)
Professors: R. P. Ashworth, N. D. Camper, C. R. Dillon, Head; Assistant Professors: L. A. Dyck, J. E. Fairey, T. M. McNnis, Jr.; Assistant Professors: R. E. Ballard, L. M. Kohn, S. B. Miller; Instructor: R. N. Holmes; Visiting Assistant Professor: K. M. Peterson

145 Environmental Dynamics 2(2,0) A nontechnical ecology course designed to aid in understanding the natural world and how it operates. Taught in the jargon of the mass media, it is designed for nonbiologists though biology students may find that it helps in assimilation of the major ecological concepts.

201 Field Botany 3(1,4) An introductory study of the classification, ecology, and natural history of plants native to South Carolina. Emphasis is on fieldwork which requires visits to many terrestrial and aquatic environments for observation and study of plant diversity. Preq: BIOL 104 and 106 or 111.

Note: Credit toward a degree will be given for only one sequence of the following: BIOL 110 or 103, 105 followed by BIOL 111 or 104, 106 dependent on the requirements for the major.
202 Survey of the Plant Kingdom 4(3,3) A survey of the major groups of plants, their structure, development, and reproduction. Evolutionary relationships as exemplified by comparisons of body organization and life cycles will be emphasized. Preq: BIOL 104 and 106 or 111.

203 Humanistic Botany 2(2.0) A nontechnical course emphasizing plant species that have had an impact on human cultural development: history, economics, religion, comfort, and pleasure. Preq: BIOL 103 and 105 or 111, or consent of instructor.

204 Mushrooms and Man 2(1,3) An introduction to the techniques of collecting, observing, and identifying mushrooms and other large, fleshy fungi and an exploration into the role of these fungi in human affairs. Mushroom cultivation, poisoning, and anthropological significance will be considered.

221 Medical Botany 2(2.0)S A nontechnical course dealing with plant-originated drugs and substances used in modern treatment of physical and mental maladies of man will be studied along with plant products historically associated with folk medicine. Plants producing substances which are remedial, psychoactive, poisonous, carcinogenic, antibiotic, hallucinogenic, and others are included in this study. Preq: BIOL 103, 105 or 110, 111, or consent of instructor.

254 Plant Structure 2(2.0) Consideration of the structure of seed plants, including external and internal organization of seeds, roots, stems, leaves, flowers, and fruits. Designed for students desiring a basic knowledge of plant organization; not open to Botany majors.

331, 631 Introductory Plant Taxonomy 3(2,3) The identification, classification, distribution, and interrelationships of vascular plants, with emphasis on the flora of South Carolina. Preq: BIOL 104 and 106 or 111.

411, 611 Introductory Mycology 3(1,6) An introduction to all the groups of fungi and some related organisms with considerations of the morphology, cytology, growth, reproduction, and culture of selected forms. Preq: BIOL 104 and 106 or 111, or consent of instructor.

413, 613 Phycology 4(3,3) Introduction to the biology of algae. Consideration is given to the structure, classification, evolution, natural history, physiology, and ecology of all algal groups. Laboratory includes experimentation, collection and identification of both freshwater and marine algae, and a field trip to the Florida Keys over the spring break. Preq: BIOL 104 and 106 or 111, or consent of instructor.

421, 621 Plant Physiology 4(3,3) The relations and processes which have to do with the maintenance, growth, and reproduction of plants, including absorption of matter and energy, water relations of the plant, utilization of reserve products and liberation of energy. Preq: CH 101, 102, PHYS 207 or 221 and 223.

432, 632 Plant Geography 3(3.0) A descriptive study of the origin, distribution, and adaptations of plants and associations of plants as influenced by certain factors including climate, genetics, and cultural developments. Emphasis will be on the major floral provinces of North America. Preq: BIOL 104 and 106 or 111, or consent of instructor.

435, 635 Plant Biosystematics 3(3.0) Examination of species concepts and factors affecting the formation of species. Preq: BOT 331. GEN 302, or consent of instructor.

437, 637 Phylogeny of Angiosperms 3(3.0)F. Even-numbered years. A study of the origin, evolution, dispersal, morphological specialization, and geologic history of the angiosperms. Preq: BOT 331. 455. or consent of instructor.

441, 641 Plant Ecology 4(3,3) Detailed study of the effects of environmental factors upon plants and of the influence of plants upon the environment. Identification and analysis of interrelated biotic and physical factors which affect the structure, distribution, and dynamics of individual plants, plant populations, and ecosystems. Preq: BIOL 104 and 106 or 111, or consent of instructor.

446, 646 Biological Oceanology 3(3.0) Introduction to the study of the oceans, their biological constituents and the physical and chemical characteristics of salt water. Other topics considered
are the history of oceanography, currents, wind patterns, estuaries, shorelines, and ocean resources. \textit{Preq:} BOT 202, CH 102 or 112 and ZOOL 201, or consent of instructor.

451, 651 \textbf{Plant Anatomy 4(3.3)} Studies of the origin, development, and comparative structures of tissues, systems, and organs of higher plants. \textit{Preq:} BIOL 104 and 106 or 111, BOT 202, or consent of instructor.

455, 655 \textbf{Vascular Plant Morphology 4(3.3)} Consideration of the structure, reproduction, and phylogenetic relationships of representative vascular plants. \textit{Preq:} BIOL 104 and 106 or 111, BOT 202, or consent of instructor.

456, 656 \textbf{Plant Microtechnique 2(0.6)} Application of the principles of microtechnique involved in the fixing, cutting, and staining of plant tissues. \textit{Preq:} BOT 451, 455, or consent of instructor.

461, 661 \textbf{Cytology 3(3.0)} Detailed consideration of the general and ultrastructural morphology of plant cells, cell division, and cell differentiation. A lecture course considering both the classical and contemporary knowledge of cell structure and development. \textit{Preq:} BIOL 104 and 106 or 111.

491 \textbf{Special Problems in Botany 2-4(0.6-12)} Research problems in selected areas of botany to provide an introduction to research planning and techniques for Botany majors. \textit{Preq:} Senior standing and consent of the department head.

701 \textbf{Evolutionary Botany for Teachers 3(2.3)}

702 \textbf{Modern Botanical Concepts for Teachers 3(3.0)}

805 \textbf{Special Problems in Botany. Credit to be arranged.}

807 \textbf{Seminar 1(1.0)}

813 \textbf{Special Topics in Mycology 2-4(0-2.0-6)}

815 \textbf{Phycology Colloquium 1-3(1-3.0)}

821 \textbf{Inorganic Plant Metabolism 4(3.3)}

822 \textbf{Organic Plant Metabolism 3(3.0)}

823 \textbf{Plant Growth and Development 3(3.0)}

824 \textbf{Mode of Action of Growth Substances 4(3.3)}

826 \textbf{Physiology of the Fungi 3(3.0)}

831 \textbf{Advanced Plant Taxonomy 3(2.3)}

832 \textbf{Special Topics in Plant Systematics 1-4(1-3.0-3)}

841 \textbf{The Biology of Aquatic Vascular Plants 3(2.3)}

842 \textbf{Physiological Plant Ecology 3(3.0)}

843 \textbf{Physiological Plant Ecology Laboratory 1(0.3)}

845 \textbf{Special Topics in Plant Ecology 1-4(1-3.0-3)}

861 \textbf{Plant Cell Biology 3(3.0)}

891 \textbf{Master's Research. Credit to be arranged.}

991 \textbf{Doctoral Research. Credit to be arranged.}

\textbf{CERAMIC ARTS (CRAR)}

\textit{Professor:} G. C. Robinson; \textit{Associate Professor:} H. G. Lefort

101 \textbf{Pottery Materials 3(2,3)} The occurrence and properties of pottery raw materials. Attention is devoted to the occurrence of natural pottery materials in South Carolina and the methods and equipment used in preparing these materials.

102 \textbf{Pottery Drying and Firing 3(3.0)} The drying and firing processes used in pottery making. A discussion is included on the design and construction of simple pottery kilns, and the student
is required to build and operate a small outdoor kiln. The laboratory work demonstrates the drying and firing behavior of pottery.

CERAMIC ENGINEERING (CRE)

201 Introduction to Ceramic Engineering 2(2.0) An introduction to ceramic engineering together with a study of ceramic forming operation. Exercises are provided in the analysis of processing problems, the evaluation of background information and the creation of new solutions to processing problems.

202 Ceramic Materials 3(3,0) The properties and uses of commonly used ceramic materials. Equilibrium diagrams are used to gain an understanding of the effect of heat on the materials.

204 Laboratory Procedures 1(0,3) An introduction to ceramic laboratory procedures. Primary consideration will be given to the evaluation of sources of error and significance of measurement in the major ceramic test procedures.

302 Thermo-Chemical Ceramics 3(3.0) High-temperature equilibrium using the laws of physical chemistry as applied to ceramic systems in both solid and liquid states. An introduction to the crystal chemistry of ceramic raw materials, and the effect of crystalline form on their high-temperature behavior.

303 Materials Technology in Product Selection by Consumers 2(2.0) This course is intended to convey to the consumer a sufficient understanding of the properties of materials—metals, plastics, and ceramics—to enable the customer to make intelligent buying decisions. Property characteristics are related to cost and performance. Specific cases involving decisions are used to illustrate fundamental principles. Simple tests to determine material properties are suggested for consumer use.

304 Experiment Design 2(1,3) An exercise in the planning and organization of experiments in the ceramic field.

306 Fuels Combustion and Heat Transfer 1(0,3) Combustion devices, the calculation of combustion problems and heat transfer.

307 Thermal Processing of Ceramics 3(3.0) The accomplishment of changes in structure and composition through the application of thermal energy. The course includes a study of simultaneous transfer of heat and mass, fluid flow, determinants of rates in a variety of reactions and calculations of the energy requirements to accomplish change in structure or composition.

309 Research Methods 2(0,6) The planning and solution of selected research problems.

310 Introduction to Material Science 3(3,0) A beginning course in material science designed primarily for engineering students. The course is a study of the relation between the electrical, mechanical and thermal properties of products and the structure and composition of these products. All levels of structure are considered from gross structures easily visible to the eye through electronic structure of atoms.

402, 602 Solid State Ceramics 3(3,0) The effects of the composition, form, and shape of ceramic raw materials on the manufacturing processes and final properties of ceramic products. Included are fundamental studies of such phenomena as deflocculation, plasticity, sintering and the behavior of ceramic products in electrical circuits. Preq: Junior standing.

403, 603 Glasses 3(3,0) Glass structure and composition and their relation to the properties of glasses. Consideration is given to the processing variables which control the properties of glasses including glass products, enamels, glazes, and vitreous bonds.

406 Ceramic Project 2(0,6) The completion of an original research into a ceramic problem. Preq: CRE 302.

407 Plant Design 3(1,6) The application of the fundamentals of ceramic engineering to problems in plant design. Preq: Senior standing in Ceramic Engineering.

410, 610 Analytical Processes 3(2,3) An introductory course on the theory and use of X-ray diffraction and spectroscopic methods. Preq: Junior standing.

412, 612 Raw Material Preparation 3(3,0) The equipment and processes used in the crushing and grinding of raw materials, the separation and classification of particle sizes, and the separation and purification of minerals by mineral dressing methods.

416, 616 Electronic Ceramics 3(3,0) The theory and measurement of the electronic properties of ceramic products.

418, 618 Process Control 3(3,0) Process control techniques and apparatus with particular emphasis on temperature measurement and control systems. The application of laboratory techniques to the control of product quality and process efficiency is included. Preq: Junior standing.

419, H419, 619 Science of Engineering Materials 3(3,0) This course is planned to acquaint engineers with the thermal, electrical, and chemical characteristics of engineering materials. It emphasizes fundamental consideration of the structure of matter in the solid and glassy states, solid state reactions, and the influence of particle and aggregate structure to speed of reaction and product properties. The reasons for the properties of materials at elevated temperatures and room temperatures are related to these fundamentals.

420, 620 Science of Engineering Materials 3(3,0) Continuation of CRE 419 with emphasis on application of fundamentals in nuclear reactors and nuclear power plants. Consideration is given to the development of ceramics for fuel elements, moderator materials, control rods, shielding and radioactive waste disposal.

701 Special Problems 3(1-3,0)

807 Specialized Ceramics 3(3,0)

809 High-Temperature Materials 3(3,0)

814 Ceramic Physical Processing 3(3,0)

815 Colloidal and Surface Science 3(3,0)

816 Constitution and Structure of Glasses 3(3,0)

821 Analytical Procedures and Equipment I 3(2,3)

822 Analytical Procedures and Equipment II 3(2,3)

824 Mechanical Properties of Ceramic Materials 3(3,0)

825 Magnetic and Electrical Ceramic Material 3(3,0)

826 Ceramic Coatings 3(3,0)

828 Solid State Ceramic Science 3(3,0)

891 Master’s Research. Credit to be arranged.

CHEMICAL ENGINEERING (CHE)

Professors: F. C. Alley, W. B. Barlage, Jr., Head; W. F. Beckwith, R. C. Harshman, J. C. Mullins; Associate Professors: J. N. Beard, Jr., D. D. Edie, S. S. Melsheimer; Assistant Professors: J. M. Haile, R. W. Rice, W. H. Talbott; Visiting Assistant Professor: M. A. Yazar

201 Introduction to Chemical Engineering 3(2,2) An introduction to the concepts of chemical engineering and a study of PVT relations for gases and vapors, material and energy balances, equilibria in chemical systems, and combined material and energy balances. Preq: CH 112, ENGR 180.
210 Process Modeling and Numerical Methods 3(3,0) This course will introduce students to some basic concepts of chemical process modeling and the use of numerical methods for solution of typical chemical engineering problems. Digital computational techniques for the numerical methods will use a specific procedure-oriented language such as Fortran. **Preq:** CHE 201, ENGR 180, MTHSC 206.

301 Unit Operations Theory I 3(3,0) The general principles of chemical engineering and a study of the following unit operations: Fluid Flow, Fluid Transportation, Heat Transmission and Evaporation. Special emphasis is placed on theory and its practical application to design. **Preq:** CHE 210, MTHSC 206.

302 Unit Operations Theory II 3(3,0) A study of selected unit operations based on diffusional phenomena. Primary attention will be given to differential contact operations such as absorption, humidification, and gas-liquid contact. **Preq:** CHE 301.

306 Unit Operations Laboratory I 1(0,3) Through the spring of 1981.

306 Unit Operations Laboratory I 2(1,3) Laboratory work in the unit operations of fluid flow, heat transfer, and evaporation. Stress is laid on the relation between theory and experimental results and on report writing. **Preq:** CHE 301.

331, H331 Chemical Engineering Thermodynamics I 3(3,0) A first basic course in static equilibria. Topics include the First and Second Laws of Thermodynamics real and ideal gases, thermodynamic properties of fluids, phase changes, and heats of reaction. **Preq:** CH 331, CHE 210, MTHSC 208.

353, 653 Process Dynamics 3(3,0) Basic process control and the effect of feedback in various systems. The mathematical analysis of the dynamic response of process systems to step and sinusoidal changes. Determination of the optimum settings for various combinations of proportional, reset and derivative control. **Preq:** Junior or Senior standing in engineering, physics, or chemistry, and MTHSC 309, or consent of department head.

401, H401, 601 Transport Phenomena 3(3,0) Mathematical analysis of single and multidimensional steady-state and transient problems in momentum, energy, and mass transfer. Both the similarities and differences in these mechanisms are stressed. **Preq:** CHE 302, MTHSC 309, or consent of instructor.

403 Unit Operations Theory III 3(3,0) Study of unit operations not covered in CHE 301 and 302. Includes liquid-liquid extraction, distillation, and other unit operations. **Preq:** CHE 332, CHE 302, 331.

407 Unit Operations Laboratory II 2(0,6) Through the fall of 1981.

407 Unit Operations Laboratory II 3(1,6) Continuation of CHE 306 with experiments primarily on the diffusional operations. Additional lecture material on report writing and general techniques for experimental measurements and analysis of data. **Preq:** CH 332, CHE 302, 306.

415, 615 Introduction to Nuclear Engineering 3(3,0) Designed to acquaint the nonnuclear engineer with some of the engineering aspects of nuclear science. Topics include a brief survey of particle physics; nuclear reactions; energy transformations; nuclear reactors, their design, construction and use; radiation damage to materials of construction; and special problems in nuclear engineering peculiar to the basic engineering disciplines. **Preq:** Junior of Senior standing in engineering, chemistry, or physics.

421, 621 Process Development, Design, and Optimization of Chemical Engineering Systems I 3(2,3) A study of the steps in creating a chemical process design from the original concept to successful completion and operation of the plant. Topics include engineering economics, systems analysis, simulation, optimization, process equipment sizing and selection, and the application of analog and digital computers. **Preq:** CH 332, CHE 302, 331.

422, 622 Process Development, Design, and Optimization of Chemical Engineering Systems II 3(0,9) Continuation of CHE 421. The principles of process development, design, and
optimization are applied in a comprehensive problem carried from a general statement of the problem to detailed design and economic evaluations. \textit{Preq:} CHE 421, 430, 450.

424, 624 \textbf{Introduction to Industrial Pollution} 3(3,0) An introduction to air and water pollution problems associated with chemical processing, transportation and power generation. Basic processes and mechanisms utilized in the control of liquid and gaseous wastes are discussed from a standpoint of equipment design and economics. Present and future trends in pollution legislation are reviewed. \textit{Preq:} Senior standing or consent of instructor.

430, 630 \textbf{Chemical Engineering Thermodynamics II} 3(3,0) Continuation of CHE 331. Subjects include heat engines, compressors, refrigeration, phase equilibria, and chemical reaction equilibria. \textit{Preq:} CHE 331.

440 \textbf{Senior Inspection Trip} 0 A three- or four-day trip is made to visit selected chemical plants. Using lectures by plant personnel supplemented by conducted tours of chemical plant installations, the student is introduced to current industrial practice. \textit{Preq:} Senior standing in chemical engineering.

450, 650 \textbf{Chemical Engineering Kinetics} 3(3,0) An introduction to the kinetics of chemical reactions. Topics include homogeneous and heterogeneous reactions, batch and flow reaction systems, catalysis, and design of industrial reactors. \textit{Preq:} Completion of all 200- and 300-level courses in chemistry, chemical engineering, and mathematics.

491, H491 \textbf{Special Projects in Chemical Engineering} 1-3(1-3,0) As a need arises, special topics requested by students or offered by the faculty will be taught. Review of current research in an area, technological advances and national engineering goals are possible topic areas.

802 \textbf{Process Dynamics and Control} 3(3,0)
803 \textbf{Heat, Mass, and Momentum Transfer} 3(3,0)
804 \textbf{Chemical Engineering Thermodynamics} 3(3,0)
805 \textbf{Chemical Engineering Kinetics} 3(3,0)
806 \textbf{Process Systems Analysis and Simulation} 3(3,0)
812 \textbf{Polymer Engineering} 3(3,0)
814 \textbf{Applied Numerical Methods in Process Simulation} 3(3,0)
815 \textbf{Polymer Engineering Laboratory} 3(2,3)
818 \textbf{Polymer Processing} 3(3,0)
821 \textbf{Heat Transport} 3(3,0)
822 \textbf{Mass Transfer and Differential Contact Operations} 3(3,0)
823 \textbf{Mass Transfer and Stagewise Contact Operation} 3(3,0)
845 \textbf{Selected Topics in Chemical Engineering} 3(3,0)
846 \textbf{Selected Topics in Chemical Engineering} 3(3,0)
891 \textbf{Master's Research} Credit to be arranged.
904 \textbf{Chemical Engineering Thermodynamics} 3(3,0)
945 \textbf{Selected Topics in Chemical Engineering} 3(3,0)
946 \textbf{Selected Topics in Chemical Engineering} 3(3,0)
991 \textbf{Doctoral Research} Credit to be arranged.

\textbf{CHEMISTRY (CH)}

101 General Chemistry 4(3,3) Students are introduced to the elementary concepts of chemistry through classroom and laboratory experience. The course emphasizes chemical reactions and the use of symbolic representation, the mole concept and its applications and molecular structure.

102, H102 General Chemistry 4(3,3) A continuation of CH 101, treating solutions, rates of reactions, chemical equilibrium, electrochemistry, chemistry of selected elements, and an introduction to organic chemistry. For students taking one year of chemistry or continuing in CH 201.

112 General Chemistry 4(3,3) A continuation of CH 101 which emphasizes solutions, thermodynamic concepts, kinetics and oxidation-reduction reactions. The laboratory emphasizes solution chemistry and qualitative analyses. Recommended for students continuing in CH 223.

201 General Chemistry 4(3,3) A continuation of CH 102 which extends the introduction to organic chemistry and includes the chemistry of carbohydrates, lipids, and proteins and their role in metabolic processes. Preq: CH 102 or consent of instructor.

223 Organic Chemistry 3(3,0) An introductory course covering the principles of organic chemistry and the derivation of these principles from a study of the properties, preparations, and interrelationships of the important classes of organic compounds. Preq: CH 112 or consent of instructor.

224 Organic Chemistry 3(3,0) Continuation of CH 223. Preq: CH 223.

225 Organic Chemistry Laboratory 2(0,6) The laboratory techniques involved in the synthesis, separation and purification, and characterization of typical examples of the classes of organic compounds. Preq: Registration in CH 223.

226 Organic Chemistry Laboratory 2(0,6) Continuation of CH 225. Preq: Registration in CH 224.

227 Organic Chemistry Laboratory 1(0,3) The synthesis and properties of typical examples of the classes of organic compounds. Preq: Registration in CH 223.

228 Organic Chemistry Laboratory 1(0,3) Continuation of CH 227. Preq: Registration in CH 224.

229 Organic Chemistry Laboratory 1(0,3) A one-semester laboratory for chemical engineering students. Preq: CH 223.

310 Elementary Chemical Instrumentation 4(2,6) The elementary principles of instruments and their use in chemical analysis, especially of biological systems, will be presented. Emphasis is on the actual use of the instruments. Preq: CH 224.

313 Quantitative Analysis 3(3,0) The fundamental principles of volumetric, gravimetric and certain elementary instrumental chemical analyses. Preq: Organic chemistry.

315 Quantitative Analysis Laboratory 2(0,6) The laboratory techniques of volumetric, gravimetric, and elementary instrumental analysis.

317 Quantitative Analysis Laboratory 1(0,3) The standard techniques of analytical chemistry—gravimetric, volumetric, and instrumental.

330 Introduction to Physical Chemistry 3(3,0) A one-semester treatment of physical chemistry which emphasizes topics that are especially useful in the life sciences, agriculture and medicine, chemical thermodynamics, equilibrium, solutions, kinetics, electrochemistry, macromolecules, and surface phenomena. Preq: One semester of calculus.

331, 631 Physical Chemistry 3(3,0) Includes the gaseous state, thermodynamics, chemical equilibria, and atomic and molecular structure, from both experimental and theoretical points of view. Preq: MTHSC 206, physics.

332, H332, 632 Physical Chemistry 3(3,0) Continuation of CH 331, including chemical kinetics, liquid and solid state, phase equilibria, solutions, electrochemistry and surfaces.

1 Credit for a degree will be given for only one of the following: CH 102 or 112.
194 Description of Courses

339, 639 Physical Chemistry Laboratory 1(0,3) Experiments are selected to be of maximum value to Chemistry and Chemical Engineering majors. *Preq:* Registration in CH 331.

340, 640 Physical Chemistry Laboratory 1(0,3) Continuation of CH 339. *Preq:* Registration in CH 332.

402, H402, 602 Inorganic Chemistry 3(3,0) The basic principles of inorganic chemistry are discussed with special emphasis on atomic structure, chemical bonding, solid state, coordination chemistry, organometallic chemistry and acid-base theories. The chemistry of certain selected elements is treated. *Preq:* CH 331, 332.

411, 611 Instrumental Analysis 4(2,6) Demonstration and operation of modern optical and electronic precision-measuring devices as they apply to the processes of analytical, physical and organic chemistry. *Preq:* Physical chemistry.

421, H421, 621 Advanced Organic Chemistry 3(3,0) A survey of modern organic chemistry with an emphasis on synthesis and mechanisms. *Preq:* CH 224, 332, or equivalent.

427, 627 Organic Spectroscopy 3(2,3) A survey of modern spectroscopic techniques used in the determination of molecular structure. Emphasis is on interpretation of spectra: nuclear magnetic resonance, ultraviolet, infrared, and mass spectroscopy, optical rotatory dispersion and circular dichroism. *Preq:* One year each of organic chemistry and physical chemistry.

435, H435, 635 Spectroscopy and Molecular Structure 3(3,0) Molecular spectroscopy and structure as elucidated by elementary quantum mechanics. Topics covered include Planck's black-body radiation formulation leading to the quantum concept, solution of Schroedinger's equation for simple systems, microwave spectroscopy, infrared and Raman spectroscopy, Fourier transformed spectra, electronic spectra and structure, and elementary statistical thermodynamics. *Preq:* CH 331, 332, MTHSC 208.

441 Glass Manipulation 2(0,6) A course designed to teach the fundamentals of glass manipulation and its application to the construction and repair of simple laboratory apparatus.

443 Research Problems 3(0,9) Original investigation of an assigned problem in a fundamental branch of chemistry. This work must be carried out under the supervision of a member of the staff. *Preq:* Senior standing in chemistry or consent of instructor.

444 Research Problems 3(0,9) Continuation of CH 443.

454, H454, 654 Chemical Synthesis 3(1,6) This course is designed to introduce the student to modern research techniques in inorganic and organic chemistry. The experiments to be carried out involve the synthesis of various types of compounds by diverse experimental techniques. Modern instrumental methods will be used to characterize the products. *Preq:* Organic chemistry.

491, H491, 691 Introduction to Radiochemistry 3(2,3) A study of natural and synthetic isotopes, including atomic and nuclear structures, properties of radiation, tracer techniques and applications. The laboratory includes methods of detection and measurement of radiation, and applications of tracer techniques. *Preq:* Senior or graduate standing, consent of instructor.

700 Physical Science in Elementary School—Chemistry 3(2,3)

701 Review of General Chemistry 3(3,0)

702 Chemistry for High School Teachers 3(2,3)

703 Special Problems in Chemistry for Elementary and Secondary School Teachers 3-6(2-6,6-0)

805 Theoretical Inorganic Chemistry 3(3,0)

807 Chemistry of the Transition Elements 3(3,0)

808 Chemistry of the Nonmetallic Elements 3(3,0)

811 Analytical Chemistry 3(3,0)
812 Chemical Spectroscopic Methods 3(2,3)  
814 Electroanalytical Chemistry 3(2,3)  
821 Organic Chemistry I 3(3,0)  
822 Organic Chemistry II 3(3,0)  
824 Fundamental Principles of Polymer Chemistry 3(3,0)  
825 Chemistry of Heterocyclic Compounds 3(3,0)  
830 Fundamentals of Physical Chemistry 3(3,0)  
831 Chemical Thermodynamics 3(3,0)  
834 Statistical Thermodynamics 3(3,0)  
835 Chemical Kinetics 3(3,0)  
837 Quantum Chemistry 3(3,0)  
840 Techniques of Experimental Chemistry 3(1,6)  
851 Seminar 0-2  
861 Principles of Biochemistry 3(3,0)  
891 Master's Research. Credit to be arranged.  
910 Special Topics in Analytical Chemistry 1-4(1-4,0)  
920 Advanced Topics in Organic Chemistry 1-4(1-4,0)  
930 Advanced Topics in Physical Chemistry 1-4(1-4,0)  
950 Microanalytical Techniques 3(1,6)  
991 Doctoral Research. Credit to be arranged.  

CIVIL ENGINEERING (CE)  
Professors: S. C. Anand, B. L. Atchley, H. W. Busching, Head: B. L. Edge, J. C. McCormac, A. E. Schwartz; Associate Professors: W. Baron, R. H. Brown, J. E. Clark, R. E. Elling, J. S. Fisher, J. L. Josey, S. Nnaji, R. F. Nowack, P. F. Rad, B. L. Sill, D. F. Stafford; Assistant Professor: M. L. Morrell; Visiting Professor: J. P. Rostron  
201 Surveying 3(2,3) Elementary plane surveying for civil engineering and other students whose curriculum requires a basic knowledge of surveying. Coverage includes measurement of distance, angles and elevations, stadia, topography, area and volume calculations, construction surveying. Field exercises provide practice in the use of surveying instruments. Preq: MTHSC 106.  
205 Civil Engineering Computer Applications 3(2,2) Review of basic FORTRAN programming followed by discussion of more advanced programming. Practical problems include use of plotting devices and computer graphics. Problem-oriented languages are studied. Preq: ENGR 180.  
310 Transportation Engineering 4(3,2) Planning, location, design, operation, and administration of highways, railroads, airports and other transportation facilities, including economic considerations, pavement design, and digital computer applications to geometric and earthwork computation. Preq: CE 201.
320 Introduction to Construction Materials 3(2,3) Basic properties of portland cement and bituminous asphalt. Classification of aggregates on the basis of strength and size distribution. Mix design procedures, field control, and adjustments. Properties of fresh mixes and hardened concrete. Behavior of other construction materials including metals, composites, and plastics. Field trips to nearby plants. *Preq:* CRE 310, EM 305.

330 Soil Mechanics 3(2,2) Mechanical and physical properties of soils and their relation to soil action in problems of engineering, such as classification, permeability, shearing strength, consolidation, stress distribution and bearing capacity of soils. *Preq:* EM 304 and Junior standing.

402 Reinforced Concrete Design 3(2,2) Analysis and design of reinforced concrete beams, columns footings, and one-way slabs using the strength design method. Includes a brief introduction to the analysis and design of beams with the working stress method. *Preq:* CE 301.

403, 603 Use of Computers in Structural Analysis and Design 3(2,2) Analysis and design of structures such as bridges, buildings, and towers using modern computer techniques; emphasis placed on use of available computer programs. *Preq:* CE 301, 302, 402, or consent of instructor.


410, 610 Traffic Engineering: Operations 3(3,0) Basic characteristics of motor-vehicle traffic; techniques for making traffic engineering investigations; design and application of traffic control devices; traffic design of parking facilities; traffic laws and ordinances; public relations. *Preq:* CE 310.

412, 612 Urban Transportation Planning 3(3,0)F Urban travel characteristics; characteristics of transportation systems; transportation and land-use studies; trip distribution and trip assignment models; city patterns and subdivision layout. *Preq:* CE 310.

417, 617 Airphoto Interpretation I 3(2,3) A brief review of the basic geometry of aerial photographs, characteristics of geologic and topographic features identifiable from aerial photographs, and site characteristics related to soil profile. Laboratory work includes soil mapping, selection of construction sites, and location of soil deposits for engineering purposes. *Preq:* Junior standing.

419, 619 General Photogrammetry 3(2,3)S Fundamentals of mapping using aerial photographs; characteristics, production and use of aerial photographs; study of the operation of popular photogrammetric instruments including aerial cameras, stereoscopic viewing and plotting equipment; use of stereocomparator and multiplex plotting instruments; scale, tilt, and coordinate calculations; construction of photomosaics. *Preq:* MTHSC 108 and Junior standing.

421, 621 Hydrology 3(3,0) Introduction of elements of surface water and groundwater hydrology. Application of hydrologic and hydraulic principles to the solution of problems concerning water supply, flood control, water quality, and related topics in water resources. *Preq:* EM 320.

424 Introduction to Construction Engineering 3(3,0) A survey of the principal methods and equipment used in the construction industry. Critical path methods, construction equipment, and construction management practices are included. *Preq:* Senior standing.

425 Engineering Relations 3(3,0) Business, legal, and ethical relations in engineering practice. *Preq:* Senior standing.

431, 631 Applied Soil Mechanics 3(2,2) Relationship of local geology to soil formations, groundwater, planning of site investigation, sampling procedures, laboratory determination of design parameter, foundation design, and settlement analysis. *Preq:* CE 330.

432, 632 Construction Project Administration 3(2,3) Development of organizational structure that will execute the construction, cost control, and coordinating functions for the project. Information systems developed to serve the job and to close the gaps between the owner, home office, field office, subcontractors, and labor. *Preq:* CE 424 or equivalent.


436, 636 Subsurface Construction 3(3,0) Classification and mechanical properties of hard and soft ground. Behavior of rock masses and stability of underground openings. Near surface and deep excavations. Fragmentation, materials handling, ground control and environmental support in typical operations. Empirical design procedures and details of field operations. Preq: CE 424 or consent of instructor.

438, 638 Construction Support Operations 3(2,3) Description of activities necessary for the completion of a construction job although not specifically recognized as direct-construction activities. General conditions, safety, security, quality assurance, value engineering. Organizational support features and typical implementation procedures. Preq: CE 424 or equivalent.

439, 639 Construction Equipment Selection and Maintenance 3(2,3) Methodology of selecting the right equipment of the right size for each task of the construction job on the basis of power-train characteristics, crew size, terrain conditions, and job requirements. Cycle time, costs, specifications, maintenance, replacement policy, monitoring. Preq: CE 424 or equivalent.

441, 641 Applied Hydraulics 3(3,0) The course is intended to present advanced concepts of hydraulics within a framework of relevant engineering problems. Topics included are flow in closed conduits, flow in open channels, hydraulic structures, flow measurements, fluid machinery, sediment transport, unsteady flow. Preq: EM 320.

453, 653 Advanced Structural Analysis 3(3,0) Analysis of statically indeterminate structures, including continuous beams, trusses and frames by virtual work, Castigliano’s theorems, three-moment equation, moment distribution, and slope deflection. Influence lines for statically indeterminate structures. Muller-Breslau principle. Approximate methods for indeterminate frames. Introduction to computerized structural analysis. Preq: CE 301.

462, 662 Coastal Engineering I 3(3,0) Introduction to coastal engineering principles, including wind wave generation and propagation, linear wave theory, and coastal processes. Indepth consideration is given to coastal structures, including groins, jetties, bulkheads, seawalls, and other structures used for shore protection and port development. Small craft harbors and design are also presented. Preq: EM 320.

463, 663 Coastal Engineering II 3(3,0) Advanced concepts in coastal engineering including nonlinear wave mechanics, littoral transport, long-period waves, and shoaling in estuaries. The emphasis of the course is on wind waves and sedimentation, the two major problems faced in coastal engineering. Preq: CE 462 and EM 320 or consent of instructor.

464, 664 Physical Models in Fluid Mechanics 3(2,2) Classical techniques of dimensioanal analysis and similitude are presented for fluid mechanics problems with actual construction of an operating physical model to solve a practical engineering problem. Problem will be chosen from the areas of coastal engineering, waste heat disposal, water quality, and river mechanics. Experimental design and instrumentation will be covered in detail. Preq: EM 320.
470, 670 Probabilistic Design in Civil Engineering 3(3,0) Review of traditional civil engineering design methodology; identify uncertainties, construct probability models of random design parameters; incorporate uncertainty into the design and planning of selected civil engineering systems. *Preq:* Senior standing in engineering or consent of instructor.

490, H490 Special Projects 1-3(1-3,0) Studies or laboratory investigations on special topic in civil engineering field which are of interest to individual students and staff members. Arranged on a project basis with a maximum of individual student effort and a minimum of staff guidance. *Preq:* Senior standing.

499 Civil Engineering Design Project 3(2,3) Class members will complete one or more engineering design projects involving synthesis of several civil engineering specialty areas such as soil mechanics, transportation structures, fluids engineering, and others. Faculty, consulting engineers, and other resource persons will assist with instruction and design development. *Preq:* Senior standing or consent of instructor.

801 Matrix Methods of Structural Analysis 3(3,0)
802 Prestressed Concrete Analysis and Design 3(3,0)
803 Reinforced Concrete Structural Systems 3(3,0)
804 Theory and Design of Thin Plates 3(3,0)
805 Plastic Analysis and Design of Steel Structures 3(3,0)
806 Metal Compression Members 3(3,0)
807 Numerical and Approximate Methods of Structural Analysis 3(3,0)
808 Finite Element Method in Engineering 3(3,0)
811 Highway Geometric Design 3(2,3)
812 Airphoto Interpretation II 3(2,3)
813 Highway and Airport Pavement Design 3(3,0)
814 Traffic Flow Theory 3(3,0)
815 Transportation Safety Engineering 3(3,0)
816 Highway Planning 3(3,0)
817 Mass Transit Planning 3(3,0)
818 Airport Planning and Design 3(3,0)
819 Transportation Research 2-4
822 Aggregates as Construction Materials 3(2,3)
830 Advanced Soil Mechanics 3(2,3)
831 Foundation Engineering 3(2,3)
835 Construction Project Modeling and Control 3(2,3)
837 Construction Specifications and Contracts 3(2,3)
840 Construction of Nuclear Power Plants 3(2,3)
846 Flow in Open Channels 3(3,0)
861 Mechanics of Sediment Transport 3(2,2)
862 Heat Transfer at Water Surfaces 3(3,0)
865 Hydrology I 3(3,0)
866 Hydrology II 3(3,0)
871 Coastal Hydrodynamics 3(3,0)
872 Marine Pollution Control 2(2,0)
889 Special Problems I 1-3
890 Special Problems II 1-3
891 Master’s Research. Credit to be arranged.
901 Theory and Design of Shell Structures 3(3,0)
902 Dynamic Analysis of Structures 3(3,0)
991 Doctoral Research. Credit to be arranged.

COACHING EDUCATION (CED)
341 Coaching and Officiating Football and Basketball 3(2,3) Designed to acquaint the student with the theoretical and practical principles, methods, and mechanics of coaching and officiating football and basketball.
342 Coaching and Officiating Baseball, Track and Field 3(2,3) Designed to prepare the student in the theoretical and practical phases of coaching and officiating in the designated areas.
442 Practicum in Coaching 3(1,6) Directed supervision in coaching.

COMMUNITY AND RURAL DEVELOPMENT (CRD)
(See courses listed under Agricultural Economics and Rural Sociology)
Professors: B. L. Dillman, J. E. Faris, Head; J. C. Hite, E. L. McLean; Associate Professor: M. S. Henry
357 Natural Resource Economics 3(3,0) The principles and problems involved in the use of soil, water, forest, and mineral resources, with special emphasis on economic aspects of alternative methods of resource utilization. *Preq:* AGEC 202; ECON 200 or 211.
411, 611 Regional Impact Analysis 3(3,0) An intensive course in the theory and practice of estimating the impacts of public and private sector activities on rural communities and regions. Topics covered include economic-base measurements, regional multipliers, benefit-cost concepts and techniques, shift-share analysis, and input-output models. *Preq:* ACCT 200 or 201; AGEC 202 or ECON 211; AGEC 352 or CRD 357.
412, 612 Regional Economic Development Policy 3(3,0) A study of policy alternatives for regional economic development. Topics include regional economic accounts, central-place and growth-center theories, multistate regional development programs, and state and local development planning. *Preq:* AGEC 202 or ECON 211.

COMPARATIVE LITERATURE (CLIT)
401 Medieval-Renaissance Studies 3(3,0) Comparative studies in Medieval and Renaissance literature. *Preq:* Two years study of a foreign language and six credits in literature.
403 Modern Studies 3(3,0) Comparative studies in modern literature. *Preq:* Two years study of a foreign language and six credits in literature.

COMPUTER SCIENCE (CPS)
110 Elementary Computer Programming 3(3,0) Introduction to computer programming and its use in solving problems. The Fortran programming language will be used.
120 Introduction to Information Processing Systems 3(3,0) Introduction to the techniques, principles and concepts of modern information processing systems, intended primarily for non-technical majors. Topics include information processing packages and applications, usage of typical information processing packages, digital computers, programming fundamentals and languages, and implementation of computer programs.
200 Description of Courses

130 Data Processing with Cobol 3(3,0) Introduction to data processing techniques and applications. Emphasis is placed on the organization and processing of data files. The Cobol programming language is used. Preq: CPSC 110 or 120, or equivalent.

150 Introductory Fortran Programming 2(2,0) Introduction to computer programming in the Fortran language.

151 Introductory PL/I Programming 2(2,0) Introduction to computer programming in the PL/I language. Preq: Knowledge of a computer programming language.

152 Introductory Pascal Programming 2(2,0) Introduction to computer programming in the Pascal language. Preq: Knowledge of a computer programming language.

153 Introductory APL Programming 1(1,0) Introduction to computer programming in the APL language. Preq: Knowledge of a computer programming language.

154 Introductory Snobol Programming 1(1,0) Introduction to computer programming in the Snobol language. Preq: Knowledge of a computer programming language.

155 Introductory RPG Programming 1(1,0) Introduction to computer programming in the RPG language. Preq: Knowledge of a computer programming language.

156 Introductory Basic Programming 1(1,0) Introduction to computer programming in the Basic language. Preq: Knowledge of a computer programming language.

210 Programming Methodology 3(3,0) Introduction to programming techniques and methodology. Topics include structured programming, top-down design, stepwise refinement, modularization criteria, program testing, and techniques for large programs. Preq: CPSC 110, 130, or 150, or equivalent.

230 Assembly Language Programming 3(3,0) Introduction to computer organization, machine language, and assembly language programming. The organization, machine language and assembly language of the IBM 370 will be studied. Preq: CPSC 110 or 210, or equivalent.

250 Advanced Fortran Programming 2(2,0) A continuing study of programming and problem solving using the Fortran language. Topics such as the use of data files and plotting will be included. Preq: CPSC 110, 120, or 150; or equivalent.

251 Advanced PL/I Programming 2(2,0) A study of the advanced features of the PL/I language. Topics such as file processing, dynamic storage allocation and compile-time facilities will be included. Preq: CPSC 151 or equivalent.

340 Introduction to Data Structures 3(3,0) Basic concepts of data structures such as queues, stacks, and lists. This course includes the study of algorithms for the manipulation of data structures, the implementation of these algorithms in existing programming languages, and applications such as storage allocation and garbage collection. Preq: CPSC 210. Coreq: CPSC 230 or equivalent.

360 Peripherals and File Design 3(3,0) A study of peripheral devices and data management as a basis for the design of information systems. Traditional data processing applications will be presented and evaluated in terms of efficiency and effectiveness. Problems using standard file organization and access techniques will be assigned. Preq: CPSC 130.

422, H422, 622 Systems Programming 3(3,0) A treatment of computer operating system facilities, with special attention being given to the local system. Topics include assembly language macros, job control language, data management, linkage editors, utilities and debugging techniques. Preq: CPSC 230.

423, 623 Introduction to Operating Systems 3(3,0) A detailed study of the management techniques for the control of computer hardware resources. Topics include interrupt systems, primitive level characteristics of hardware and the management of memory, processor, devices, and data. Specific reference is made to the IBM 370. Preq: CPSC 422.
Design and Implementation of Programming Languages 3(3,0) An overview of programming language structures and features and their implementation. Control and data structures found in various languages will be studied. Runtime organization and environment and implementation models will also be included. Preq: CPSC 230 and 340 or equivalent.

Translation of Programming Languages 3(3,0) Techniques and considerations for compiling and interpreting programming languages. Topics include scanning, parsing, optimization, code generation and their theoretical foundations. The implementation of a compiler or a major component of a compiler normally will be a term project. Preq: CPSC 422, 428.

Computer Performance Evaluation 3(3,0) Computer hardware and software measurement and evaluation in selection and improvement. Topics include measurement tools, analytic and simulation models, workload models, and program performance. Preq: CPSC 423 or E&CE 429, and MTHSC 301; or equivalent.

Microprogramming 3(3,0) Software development at the microprogram level. Topics include organization of microprogrammed computers, emulation, interpreter design, and high-level language support. A survey of microprogrammable machines is also included. Preq: CPSC 423, 428, E&CE 429.

Theory of Computation 3(3,0) An introduction to models of computation and machine description languages, including finite-state automata and regular expressions, pushdown automata and context-free languages, and Turing machines and recursive functions. Topics include equivalence and relative computing power of the models studied, enumeration, Church’s thesis, and undecidability problems. Preq: E&CE 352 or MTHSC 419, or consent of instructor.

Teleprocessing and Database Management Systems 3(3,0) An introduction to database communications concepts as related to the design of online information systems. Problems involving structuring, creating, maintaining and accessing multiple-user data bases will be presented and solutions developed. Comparison of several commercially available teleprocessing monitor and database management systems will be made. Preq: CPSC 360.

Software Development Methodology 3(3,0) Advanced topics in software development methodology. Techniques such as chief programmer teams, structured design and structured walk-throughs will be discussed and used in a major project. The emphasis of this course is on the application of these techniques to large-scale software implementation projects. Additional topics such as mathematical foundations of structured programming and verification techniques will also be included. Preq: CPSC 340, 360.

Fundamentals of Computer Science 3(3,0) A study of fundamental concepts of computers and programming, intended primarily for Computer Science graduate students without an undergraduate degree in Computer Science. Topics include machine organization, assembly language programming, programming systems, and data management. May not be taken by those who have completed CPSC 230. Preq: Expertise in programming in a high-level language and consent of instructor.

Special Topics in Computer Science 1-3(1-3,0) Areas of computer science in which nonstandard problems arise. Innovative approaches to problem solution which draw from a variety of support courses will be developed and implemented. Emphasis will be placed on independent study and projects. Preq: Consent of instructor.

Theory of Programming Languages 3(3,0)
Design and Analysis of Algorithms 3(3,0)
Special Topics 1-3(1-3,0)
Master’s Research. Credit to be arranged.
DAIRY SCIENCE (DYSC)

Professors: J. F. Dickey, R. W. Henningson, V. Hurst, J. J. Janzen, J. T. Lazar, Jr., J. H. Martin, Head; G. D. O'Dell; Associate Professor: B. F. Jenny; Assistant Professors: M. A. Barnes, A. B. Bodine II; Instructor: E. M Richardson

101 Dairy Foods 1(1,0) Dairy foods such as ice cream, yogurt, and various cheeses; the use of these foods for nutrition and pleasure. Sampling of various products will take place throughout the course.

102 Mammalian Reproduction 1(1,0) Physiology and endocrinology of the reproductive processes in male and female mammals with emphasis on farm animals. Control of reproductive cycles, diseases, sexuality, and effects of drugs on reproduction will be discussed.

304 Evaluation of Dairy Products 1(0,3) Emphasis placed on sensory evaluation of dairy products. Discussion of basic principles of organoleptic evaluation, fundamental rules for scoring and grading dairy products. Evaluation of all classes of dairy products, based on established grades and score cards. Preq: Consent of instructor.

306, H306, 606 Dairy Technology 3(2,3)S The nature and properties of the major and minor components of milk, the effect of chemical and physical treatment on milk constituents, and techniques used in the analysis of milk and water in controlling quality of dairy products.

307, H307, 607 Market Milk 3(2,3)F, Even-numbered years. Composition, procurement, processing, distribution, quality control, public health aspects, basic chemistry and bacteriology of industrial milk supplies and cultured products. Preq: Consent of instructor.

310 Dairy Cattle Selection 1(0,3)F, Even-numbered years. Emphasis is placed upon the selection of dairy cattle for profitable herd operations. Evaluations of herd classifications, fitting, showing, and true type are made.

400, 600 Cultured Dairy Products 3(2,3) Basic principles of microbiological culture propagation, types of lactic cultures, their properties and uses, as well as processing procedures, quality control, and compositional and organoleptic characteristics of cultured dairy products will be discussed. The laboratory phase will include inplant experience with culture propagation and product manufacture. Preq: MICRO 305 or consent of instructor.

401 Special Problems 1-2(0,3-6) Problems of special interest to the senior student. The course is designed to give experience with and independent study of selected dairy problems not covered in depth in other courses. Preq: Senior standing.

402, 602, Dairy Manufacturers 3(2,3)S. Even-numbered years. The principles and practice of the manufacture of ice cream and related dairy products; the principles of the manufacture of condensed and evaporated milks and milk powders; and the physical, chemical, and biological factors involved. Preq: Consent of instructor.

403, 603 Laboratory Techniques 3(2,3) Research and quality control techniques commonly used in dairy science and related agri-sciences. Preq: CH 101, 102, or consent of instructor.

404, 604 Plant Management 3(2,3)S. Even-numbered years. The organization and operation of dairy and food plants and the coordination of all functions into an orderly business enterprise. Emphasis will be given to management's responsibility concerning the procurement, processing, quality control and distribution of food products. Business and industrial techniques are used to develop maximum efficiencies.

409 Dairy Science Seminar 2(2,0)F, Odd-numbered years. Special research problems in production and manufactures are studied. Individual topics not fully covered in classwork are assigned for special report before class and members of Dairy Science staff.

410 Dairy Science Seminar 1(1,0)S, Even-numbered years. Continuation of DYSC 409 with emphasis on current research literature and research methods. Preq: Junior standing.

452, 652 Dairy Cattle Feeding and Management 3(2,3)S, Odd-numbered years. Fundamental principles in the care, feeding, and management of dairy cattle of all ages. Topics include general
consideration in selecting a breed and the individual cow, calf raising, growth and development of dairy heifers, care and management of the milking herd and feeding for milk production.

453, H453, 653 Animal Reproduction 3(3,0)F,S Reproductive physiology and endocrinology of mammals with emphasis on farm animals and frequent reference to reproduction in laboratory animals and humans. *Preq:* Consent of instructor.

455, 655 Reproductive Management 1(0,3) Application of management techniques such as artificial insemination, pregnancy detection, and computer recordkeeping for achieving a high level of reproductive efficiency in cattle. *Preq:* To be taken concurrently or to follow DYSC 453.

456, 656 Animal Reproductive Management 1(0,3) Physiology and endocrinology of the pregnant cow is discussed. Emphasis is placed on achieving proficiency in pregnancy detection techniques. *Preq:* DYSC 455 or consent of instructor.

461, 661 Physiology of Lactation 2(2,0) Anatomy and development of the mammary gland; physiological and bio-chemical regulation of mammary growth and milk secretion with emphasis on farm animals and reference to other mammals. *Preq:* BIOCH 210, CH 223, or consent of instructor.

490 Practicum 1-4 Supervised dairy science learning opportunity, providing highly individualized experiences to complement other programs and courses. Must be prearranged at least two months in advance. Must file written report midway during enrollment period and at its conclusion. Must appear for oral evaluation at the end of the period. *Preq:* Junior standing and consent of instructor.

801 Topical Problems 1-3
803 Physiology of Reproduction and Milk Secretion 3(3,0)
808 Industrial Dairy Science 3(3,0)
820 Dairy Science Graduate Seminar 1(1,0)
891 Master’s Research. Credit to be arranged.

ECONOMICS (ECON)


101 Economics in Our Times 1(1,0) A nontechnical introduction to economics based on an examination of current issues and problems for students who have not taken ECON 200, 211, or 212. Does not count toward the requirements of the major or minor in Economics.

200 Economic Concepts 3(3,0) A comprehensive course including both micro- and macro-economic concepts for the student not having theoretical course requirement beyond the principles level or for the student expecting to take a selected group of the 300-level courses in economics.

203 Consumer Economics 2(2,0) A presentation of information and material to facilitate consumer decision making in such areas as home finance, insurance, banking, investments, taxation, budgeting, and other areas of immediate concern to the American consumer.

211, H211 Principles of Economics 3(3,0) An intensive study of the economics of the firm, pricing of resources, and international economic relations. Theory is given relevance through the analysis of current economic problems.

212, H212 Principles of Economics 3(3,0) The fundamental principles of pricing, stabilization, and growth in a modern economy. Topics include supply and demand, employment theory and fiscal policy, banking system and monetary policy, and economics of growth.
301 Economics of Labor 3(3,0) The economics of the labor market, the problems of the industrial worker, and the methods of adjusting labor-management disputes. **Preq:** ECON 200 or 211, 212.

302, H302 Money and Banking 3(3,0) Considers the function of money and banking in both the product and financial markets. Special emphasis is placed on monetary theory and current problems of monetary policy. **Preq:** ECON 200 or 211, 212, and consent of instructor.

305 Investment Analysis 3(3,0) A study of techniques useful in analyzing alternative investment opportunities with emphasis on corporate securities. Investment planning and portfolio management are considered. **Preq:** ECON 211, 212, or consent of instructor.

306 Risk and Insurance 3(3,0) Studies the nature of risk and the role of insurance in risk management from individual and business viewpoints. Topics include probability, theory of the firm under uncertainty, insurance carriers and contracts, underwriting, and regulation. **Preq:** ECON 200, 211, or consent of instructor.

308 Collective Bargaining 3(3,0) The practices, procedures, legal foundations, and legal structure associated with collective bargaining. The form and content of the labor contract, the grievance machinery, and the mediation and arbitration institutions will also be studied. **Preq:** ECON 200 or 211.

309 Government and Business 3(3,0) The relationships between government and business, including among other topics, governmental efforts to enforce competition, to regulate public utilities, and to protect the special interests of laborers, farmers, and consumers. **Preq:** ECON 200 or 211.

314, H314 Intermediate Economic Theory 3(3,0) An analytical study of the basic concepts of value and distribution under alternative market conditions. **Preq:** ECON 200 or 211, 212, and consent of instructor.

403, 603 Development of Economic Thought 3(3,0) A study of the origin and evolution of economic ideas with some emphasis on the historical context, the problems which inspired these ideas, and the nature of the solutions which they provided: from ancient days to the present. **Preq:** ECON 200 or 211, 212.

404, 604 Comparative Economic Systems 3(3,0) A comparative analytical and historical study of the principal economic systems which have been important in the modern world including among others, capitalism and socialism. **Preq:** ECON 200, 211, 212.

407, H407, 607 National Income and Employment Analysis 3(3,0) Macroeconomic problems of inflation and unemployment form the focal points. Statistics (GNP and the Consumer Price Index) and theory (Classical, Keynesian, and Monetarist views) will be included. Pertinent public policies designed to deal with these problems will be analyzed. **Preq:** ECON 200 or 211.

408, 608 Arbitration 3(3,0) Analysis of dispute settlement procedures with specific emphasis on mediation, factfinding, and arbitration as they are used to resolve labor-management disputes in the public and private sectors. **Preq:** Consent of instructor.

410, 610 Economic Development 3(3,0) Consideration and analysis of economic and related problems of the underdeveloped countries. Attention will be given to national and international programs designed to accelerate solution of these problems. **Preq:** ECON 200 or 211, 212.

412, H412, 612 International Trade and Finance 3(3,0) Analysis of the principles governing trade between nations. Topics include trade theory, comparative advantage, theory and practice of commercial policy, balance of payments, determination of exchange rates, interaction of foreign and domestic sectors, price and income effects of trade, multinational corporations, and economic integration. **Preq:** ECON 314 or consent of instructor.

419, 619 Economics of Defense 3(3,0) Examines the American defense establishment in terms of resources utilized, alternative uses, and the contribution to the national economy and scientific progress generated by resources in a defense use. Discussed are economic problems
inherent in shifting resources between defense and nondefense uses and among alternative defense uses. *Preq:* ACCT 200 or 201, ECON 200 or 211.

420, H420, 620 *Public Sector Economics* 3(3,0) Study of the role of government and its proper functions and limitations in a market. Provision of goods and services by all levels of government and instruments of taxation are evaluated according to efficiency and equity criteria. Contemporary public sector issues are emphasized throughout. *Preq:* ECON 314 or consent of instructor.

421, 621 *Urban Economics* 3(3,0) Economic problems associated with the concentration of population in central places are examined. Economic reasons for the development of cities are studied and models of urban location and growth are analyzed. A major emphasis of the course is on the identification and evaluation of alternative solutions to urban economic problems. *Preq:* ECON 200 or 211, 212.

422, H422, 622 *Monetary Theory and Policy* 3(3,0) An intensive study of the role of monetary factors in economic change. Modern monetary theories and their empirical relevance for policy are developed against a background of monetary history and institutions. *Preq:* ECON 302 or consent of instructor.

424, H424, 624 *The Organization of Industries* 3(3,0) Empirical, historical, and theoretical analyses of market structure and concentration in American industry: the effects of oligopoly, monopoly, and cartelization upon price, output and other policies of the firm; antitrust and other public policies and problems will be studied. *Preq:* ECON 314 or consent of instructor.

430 *Mathematical Economics* 3(3,0) Traditional economic theories are derived using elementary mathematics. Major emphasis is placed upon microtheoretical models. Specialized topics such as cartel theory, national income analysis, price discrimination, and optimization theory over time will be economically analyzed, using mathematical tools. *Preq:* ECON 314, MTHSC 106.

499 *Senior Seminar in Economics* 1-3(1-3,0) Current economic issues, research, and community service activities will provide the subject matter for the semester. Students may participate in the analysis of issues, development of research, and other activities requiring the use of skills acquired in their undergraduate programs.

750 *Economic Concepts and Classroom Applications For Teachers* 3(3,0)
751 *Current Issues in Economics for Teachers* 3(3,0)
801 *Microeconomic Theory* 3(3,0)
802 *Advanced Economic Concepts and Applications* 3(3,0)
805 *Macroeconomic Theory* 3(3,0)
809 *Mathematical Economics* 3(3,0)
812 *History of Economic Thought* 3(3,0)
816 *Labor Economics* 3(3,0)
817 *Public Employee Labor Relations* 3(3,0)
820 *Public Sector Economics* 3(3,0)
825 *Economics of Environmental Quality* 3(3,0)
831 *Seminar in Urban Development Economics* 3(3,0)
840 *International Trade Theory* 3(3,0)
850 *Monetary Theory* 3(3,0)
888 *Directed Reading in Economics* 1-3(1-3,0)
891 *Master's Research. Credit to be arranged.*
900 *Seminar in Advanced Economic Theory* 3(3,0)
EDUCATION (ED)


100 Orientation 1(1,0) Lectures and discussions on teaching in addition to serving as teacher aides. Required of all students in Early Childhood Education, Elementary Education, Secondary Education, and Science Teaching.

101 Reading Improvement 1(0,3) Provides an individualized approach to developmental reading skills emphasizing comprehension, vocabulary, and rate.

102 Efficient Reading 1(0,3) Extends the reading skills of vocabulary, comprehension, and rate stressing skimming, scanning, flexibility, and critical reading.

103 Study Techniques 1(0,3) Aims at individual study skills in the content areas and makes application by using these techniques in college curricula. Priority given to freshmen.

301, H301 Principles of American Education 3(3,0) A study of the legal basis, historical development, characteristics, and functions of educational institutions in the United States. Preq: Junior standing or consent of instructor.

302, H302 Educational Psychology 3(3,0) The nature, capacities, equipment, growth, and development of the learner. Preq: Junior standing or consent of instructor.

334 Child Growth and Development 3(3,0) A study of the physical and emotional growth and development of the child. Preq: ED 302 or PSYCH 201.

335, H335 Adolescent Growth and Development 3(3,0) The physical and emotional growth and development of the adolescent. Preq: ED 302 or PSYCH 201.

336 Behavior of the Preschool Child 3(2,3) A study of behavior of the preschool child, including observation and participation. Preq: ED 302 or PSYCH 201.

401, 601 The Community College 3(3,0) History and philosophy of the junior college, its functions, organization and administration.

406, 606 History and Philosophy of Education 3(3,0) An analysis of the development of modern education practices and philosophies with emphasis upon the historical and philosophical development in the United States.

412 Directed Teaching in Secondary School Subjects 6(1,15) A program of supervised observation and teaching in cooperation with selected public schools in which opportunities are provided for prospective teachers to obtain experiences in the subject area. Students to be sectioned according to teaching fields: English, history, social sciences, mathematical sciences, modern languages; science. Enrollment is limited.

424 Methods and Materials in Secondary School Instruction 3(3,0) Development of instructional practices and materials appropriate for the secondary school; familiarization with curriculum materials. Students to be sectioned according to teaching area: English, history, social science, mathematical sciences, modern languages, science.

429, 629 Teacher As Manager 3(3,0) Course designed to help teachers, principals, and other school personnel solve school problems by identifying and applying selected management techniques, and to better prepare educators for the added responsibilities demanded of them by the movement to measurable improvement in their management of learning.

431, 631 Special Institute Course: Early Childhood Education 3(3,0) Subject areas organized according to Institute needs.
432, 632 Special Institute Course: Elementary School 3(3,0) Subject areas organized according to Institute needs.

433, 633 Special Institute Course: Secondary School 3(3,0) Subject areas organized according to Institute needs.

434, 634 Special Institute Course: Current Problems in Education 3(3,0) Subject areas organized according to Institute needs.

435, 635 Special Institute Course: Curriculum 3(3,0) Subject areas organized according to Institute needs.

436, 636 Special Institute Course: Supervision and Administration 3(3,0) Subject areas organized according to Institute needs.

458 Health Education 3(3,0) A study of the information needed for effective cooperation with parents, physicians and public health agencies in the promotion and improvement of community health, including problems of personal hygiene, health records, immunization, and control of communicable disease.

459 Fundamental Skills for Reading Instruction 3(2,2) Study of language development, preschool and primary reading process, historical development of reading, and basic skills. Laboratory field experiences to be arranged with each individual.

461 Teaching Reading in the Elementary School 3(2,3) Study of the various phases of reading and their relation to the elementary program. Emphasis on modern practices in the classroom teaching of reading. Includes observation and participation in the elementary classroom. *Preq:* For student teachers or consent of instructor.

462 Diagnostic and Corrective Reading 3(2,3) The purpose of this course is to prepare the prospective classroom teacher for diagnosing and correcting reading problems. Laboratory field experiences will be arranged for each individual. *Preq:* Three semester hours in reading or consent of instructor.

466 Curriculum for Early Childhood Education 3(2,2) Overview of Early Childhood curriculum for nursery schools, kindergartens, and primary grades. Laboratory hours to be arranged in preschool and primary grades. Laboratory hours to be arranged during the public school day in preschool and primary grades.

469, 669 Characteristics of Children with Emotional Handicaps 3(3,0) Intensive study of the meaning and concepts associated with emotionally handicapped. Analysis of the causes and characteristics of emotionally handicapped. *Preq:* ED 302, or PSYCH 201 and ED 471, or consent of instructor.

470, 670 Characteristics of Children with Learning Disabilities 3(3,0) The nature and extent of perceptual, motor, and conceptual impairments are examined. Team functions, community role, and family needs are emphasized. *Preq:* ED 302, ED 471 and PSYCH 201, or consent of instructor.

471, 671 The Exceptional Child 3(3,0) Survey of exceptionality including handicapped and gifted children; nature, cause, and treatment of difficulties; educational problems.

472, 672 Psychology of Mental Retardation 3(3,0) Psychological aspects of mental retardation; learning, motivation, and personality development.

473, 673 Teaching the Mentally Retarded 3(3,0) Study, selection, and preparation of curricular materials; methods of teaching retarded children within the preadolescent and adolescent range. *Preq:* ED 472 or equivalent.

474, 674 Educational Procedures for Children with Emotional Handicaps 3(3,0) Major problems of teaching disturbed children; curriculum and instructional modifications, program planning, facility adaptation, behavior controls, articulation with mental health specialists, and procedures to develop readiness for return to regular class. *Preq:* ED 302, ED 471 and PSYCH 201, or consent of instructor.
208 Description of Courses

475, 675 Educational Procedures for Children with Learning Disabilities 3(3,0) Special emphasis is given to educational evaluation and remedial procedures designed to improve the individual's learning abilities. A multisensory approach is emphasized geared to individual need. Preq: ED 302, ED 471 and PSYCH 201, or consent of instructor.

476, 676 Practicum in Learning Disabilities 3(2,3) Designed to provide practical experience in teaching the learning disabilities under the supervision of College faculty and local teachers of learning disabilities. Preq: ED 470, 471, 475, or consent of instructor.

477, 677 Characteristics of Children Who Are Gifted 3(3,0) This course is designed to acquaint the student with definitions, incidences, characteristics, identification procedures, and curriculum options for the gifted. Preq: ED 471.

478, 678 Practicum in Emotionally Handicapped 3(2,3) Designed to provide practical experience in teaching the emotionally disturbed under the supervision of College faculty and local teachers of emotionally handicapped. Preq: ED 469, 471, 474, or consent of instructor.

479, 679 Practicum in Mentally Retarded 3(2,3) Designed to provide practical experience in teaching the mentally retarded under the supervision of College faculty and local teachers of mentally retarded. Preq: ED 471, 472, 473, or consent of instructor.

481 Directed Teaching in the Elementary School 6(1,15) Supervised observation and teaching experiences in cooperation with selected elementary schools. Enrollment is limited to seniors or graduates who have completed prerequisite courses and who have the accumulated grade-point ratio for graduation.

483 Methods and Materials for Early Childhood Education 3(2,3) Study of methods and materials applicable to nursery schools, kindergarten, and early elementary grades. Includes observation and participation in preschool and/ or primary grades.

484 Directed Teaching in Early Childhood Education 6(1,15) Supervised observation and teaching experiences in cooperation with nursery, kindergartens, and early elementary schools. Enrollment is limited to seniors or graduates who have completed prerequisite courses and who have the accumulated grade-point ratio for graduation.

485 Methods and Curriculum in Elementary Mathematics and Science 3(2,3) Develop understandings, skills, and attitudes in the elementary mathematics and science curricula, with emphasis on strategies, techniques, and materials for teaching elementary mathematics and science. Includes observation and participation in the elementary classroom.

486 Methods and Curriculum in Elementary Social Studies and Language Arts 3(2,3) Study of the elementary program with emphasis upon social studies and language arts materials, curriculum, and methodology. Includes observation and participation in the elementary classroom.

497, 697 Audio-Visual Aids in Education 3(3,0) The techniques and uses of audio-visual aids in improving teaching effectiveness.

498 Secondary Content Area Reading 3(1,4) Designed for preservice teachers who are involved with field experiences prior to student teaching full time. The course is designed to prepare content area teachers to teach the reading skills necessary for effective teaching of content area material. Preq: For students enrolled in professional block semester.

705 Principles of Guidance 3(3,0)

707 Reading and Independent Study in Education 3(3,0)

720 School Personnel Administration 3(3,0)

721 Legal Phases of School Administration 3(3,0)

722 Field Experiences in School Administration 3(2,3)

741 Introduction to Pupil Personnel Services in Higher Education 3(3,0)

742 Psychology of Post Secondary School Youth 3(3,0)
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>759</td>
<td>Fundamentals of Basic Reading</td>
<td>3(3,0)</td>
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<tr>
<td>760</td>
<td>Curriculum Development in the Elementary School</td>
<td>3(3,0)</td>
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<tr>
<td>761</td>
<td>Reading Instruction in the Elementary School</td>
<td>3(3,0)</td>
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<tr>
<td>762</td>
<td>Reading Diagnosis and Remediation</td>
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<td>763</td>
<td>Middle School Reading</td>
<td>3(3,0)</td>
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<td>764</td>
<td>The Role of the Library in the Reading Program</td>
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<td>765</td>
<td>Secondary School Curriculum</td>
<td>3(3,0)</td>
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<tr>
<td>794</td>
<td>School and Community Relationships</td>
<td>3(3,0)</td>
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<tr>
<td>798</td>
<td>Teaching Secondary School Reading</td>
<td>3(3,0)</td>
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<tr>
<td>801</td>
<td>Seminar in Human Growth and Development</td>
<td>3(3,0)</td>
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<td>802</td>
<td>Human Development: Psychology of Learning</td>
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<td>803</td>
<td>Advanced Methods of Teaching in the Secondary School</td>
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<td>804</td>
<td>Advanced Methods of Teaching in the Elementary School</td>
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<td>808</td>
<td>Educational Tests and Measurements</td>
<td>3(3,0)</td>
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<td>809</td>
<td>Analysis of the Individual</td>
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<td>810</td>
<td>Theories and Techniques of Counseling</td>
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<td>811</td>
<td>School Finance</td>
<td>3(3,0)</td>
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<td>813</td>
<td>Educational and Vocational Informational Service and Placement</td>
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<td>814</td>
<td>Field Experiences in Elementary School Guidance</td>
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<td>815</td>
<td>Field Experiences in Secondary School Guidance</td>
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<td>816</td>
<td>Field Experiences in Personnel Services in Higher Education</td>
<td>3(2,3)</td>
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<td>817</td>
<td>Development of Counseling Skills</td>
<td>3(3,0)</td>
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<td>818</td>
<td>Field Problems in School Administration and Supervision of Instruction</td>
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<td>819</td>
<td>Psychoeducational Evaluation Internship</td>
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<td>820</td>
<td>Teaching Language Arts to the Exceptional Child</td>
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<td>821</td>
<td>Assessment of the Exceptional Child</td>
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<td>Teaching Mathematics to the Exceptional Child</td>
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<td>830</td>
<td>Techniques of Supervision—the Public Schools</td>
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<td>831</td>
<td>Evaluation of Secondary School Instruction</td>
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<td>832</td>
<td>Evaluation of Elementary School Instruction</td>
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<td>850</td>
<td>Public School Administration</td>
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<td>853</td>
<td>Administration and Supervision of Special Education</td>
<td>3(3,0)</td>
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<tr>
<td>856</td>
<td>Introduction to School Building Planning</td>
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<tr>
<td>861</td>
<td>Organization and Supervision of Reading Programs</td>
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<tr>
<td>862</td>
<td>Clinical Research in Reading</td>
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<td>863</td>
<td>Practicum in Reading</td>
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<td>864</td>
<td>Special Problems in Reading Education</td>
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<td>865</td>
<td>Advanced Diagnosis and Remediation in Reading</td>
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<tr>
<td>866</td>
<td>The Psychology of Teaching Reading</td>
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<td>867</td>
<td>Advanced Practicum in Reading</td>
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<td>871</td>
<td>Interpersonal and Group Relationships</td>
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<tr>
<td>881</td>
<td>Individual Testing</td>
<td>3(3,0)</td>
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ELECTRICAL AND COMPUTER ENGINEERING (E&CE)


200 Introduction to Electronics Industry 3(1,4) Introduction to the electrical manufacturing industry through participation in an electrical engineering oriented project. A study of the design procedures in electrical circuits and an introduction to construction and testing of prototypes with application of elementary economical evaluation of a manufacturing process. Preq: ENGR 180. Coreq: MTHSC 106.

201 Logic and Computing Devices 3(1,4) A study of logic with an introduction to Boolean algebra. Number systems and representation of information. The use of integrated circuits to implement combinational and sequential logic functions and computing elements. The organization and structure of computing systems.


203 Electrical Circuits Laboratory I 1(0,2) A laboratory course designed to accompany E&CE 202. Introduction to basic electrical circuits and instrumentation. Coreq: E&CE 202.

250 Principles of Digital Computer Systems 3(3,0) Introduction to minicomputers and microcomputers. Topics include machine organization and operation, information flow within a machine, data types and structures, data transfers and communication with external devices, computer response time, interrelation between software and hardware, memory types, specifying cost-effective small computer systems, application examples. Introductory assembly language programming. Coreq: E&CE 201.

299 Digital Computation 2(1,2) A programming course emphasizing engineering applications. Familiarity with the fundamentals of Fortran programming is assumed. Preq: Elementary knowledge of Fortran.

301, H301 Electric Circuits II 2(2,0) Continuation of the study of electric circuits, including single- and three-phase circuits with sinusoidal excitation, rms and average values, power and reactive power, complex frequency, resonance, coupled circuits, circuit equations in state variable form. Preq: E&CE 202. Coreq: E&CE 303.

302 Linear Control Systems 3(3,0) An introduction to linear control systems. Topics include plant representation, applications of state variables, time and frequency response, stability, system specification, and system design. Preq: E&CE 301, 330, and EM 202 or 211.

303 Electrical Circuits Laboratory II 1(0,2) A laboratory course designed to accompany E&CE 301. Characteristics of circuits. Coreq: E&CE 301.

307 Basic Electrical Engineering 2(2,0) A first course in electrical engineering to provide non-Electrical Engineering majors with a knowledge of electric circuit theory, both dc and ac. The last five weeks of the semester are devoted to an introduction to digital systems. Preq: MTHSC 206, PHYS 221. Coreq: E&CE 309.

308 Electronics and Electromechanics 2(2,0) Continuation of E&CE 307. Energy conversion systems are considered, as well as basic electronics, plus instrumentation with emphasis on digital methods. Preq: E&CE 307. Coreq: E&CE 310.
309 Electrical Engineering Laboratory I 1(0,2) A laboratory designed to accompany E&CE 307. Basic electrical circuits and instrumentation. Coreq: E&CE 307.

310 Electrical Engineering Laboratory II 1(0,2) A laboratory designed to accompany E&CE 308. Basic electronics and energy conversion. Coreq: E&CE 308.

317 Electrical Systems Analysis 3(3,0) Introduction to engineering problems of a probabilistic nature. Problems will be solved which utilize the concepts of probability space and functions of random variables. Preq: E&CE 330.


322 Electronics for Computer Engineers 3(3,0) Device models, logic circuits and integrated devices with particular emphasis on digital applications, small signal amplifiers. Applications of digital and linear integrated circuits. Credit not given for students who have taken E&CE 320 and 321. Preq: E&CE 202, 301 or 307, 308.


326 Electronics Laboratory II 1(0,2) A laboratory designed to accompany E&CE 321. Characteristics of different amplifier configurations. Coreq: E&CE 321.


340 Electric and Magnetic Fields I 2(2,0) An introduction to classical electromagnetics. Topics include vector analysis, Coulomb’s law, electric field intensity, Gauss’s law, potential theory, solution of Laplace’s equation, and dc magnetic fields. Preq: MTHSC 208, PHYS 221.

341, H341 Electric and Magnetic Fields II 2(2,0)F.S Continuation of E&CE 340 to include magnetic circuits and devices and forces in magnetic fields, time-varying fields, Maxwell’s equations, and transmission lines. Preq: E&CE 340.

351 Real-Time Application of Digital Computers 3(2,2)S Application and operation of digital computers in a real-time or time-critical environment. Topics include interrupt facilities, analog-to-digital and digital-to-analog signal conversion, digital computer interfaces, on-line acquisition and reduction of data. Software concepts include multitask real-time executives, schedulers, and dynamic resource allocation systems. Preq: E&CE 250 or consent of instructor.

352 Machines, Languages, and Algorithms 3(3,0)S Topics fall into three major areas: discrete structures, formal languages, and finite state models. Emphasis is placed on relating formalisms to practical considerations such as logical design of digital machines and the limitations of machine computation. Preq: Junior standing in engineering or the physical sciences, or consent of instructor.

353 Principles of Software Engineering 2(0,0) An indepth study of software design and implementation as applicable to mini- and micro-computers. Topics include assembly language programming; use of editors, loaders, monitors, etc.; data structure fundamentals and software design methodologies. Preq: E&CE 250.

402 Engineering Projects 1(0,2) Knowledge and skills needed by electrical engineers to function as a project leader or team member in an industrial environment. Topics considered include project proposals, planning, operation, and reports. Case studies and role-playing meth-
ods of instruction are used. Preq: Senior standing in Electrical and Computer Engineering or consent of instructor.

403, 603 Energy Conversion 3(3,0)F Various methods of energy conversion with emphasis on solar energy which includes conversion techniques, storage, applications, systems, and future trends. Other energy conversion methods including fuel cells, magnetohydrodynamics, and nuclear are covered. Preq: MTHSC 208, PHYS 222.

404, 604 Semiconductor Devices 3(3,0) Consideration of the principles of operation, the external characteristics, and the applications of some of the more important semiconductor devices presently available. Preq: Introductory electronics course.

405, H405 Special Problems 1-3 F, S Electrical engineering problems assigned to the student according to his needs and capabilities. The purpose is to give students a chance to do projects, either theoretical or experimental, on subjects not covered in other courses. May be repeated for a maximum of six credits. Preq: Consent of problem supervisor.

406, 606 Introduction to Integrated Circuits 3(3,0)F Integrated circuit technology, devices and applications. Discussion of fabrication methods, survey of standard circuit characteristics, design and layout principles, linear and digital circuit applications. Preq: E&CE 320.


411, 611 Electrical Systems 1(0,2) Experimental investigations in the areas of mathematical modeling, transient and steady-state responses of second and higher order systems, Bode plots, Nyquist's plots, modulation, system identification, and Pade's rational function approximations. Coreq: E&CE 302, 422.

412, 612 Digital Computer Systems 3(3,0) Several mini- and microcomputer system topics are studied for the engineering application of these systems in industrial on-line systems. Topics include logic circuits and devices, computer representation of data and text, computer operation and organization, programming systems, analysis and design of computer interfaces, data communication, and industrial application. Preq: Consent of instructor.

414 Electromechanics 3(2,2) The principles of energy conversion are introduced with emphasis on electromagnetic and electromechanical devices. From these the mathematical and equivalent circuit models are developed, considering nonlinear magnetic characteristics and linear approximation. In laboratory studies are made on transformers and ac and dc motors and generators. Preq: E&CE 301, 341.

415, 615 Information Theory 3(3,0)S A course designed for those interested in developing a precise definition of information, and then applying this definition to the study of communication. Coding and the effect of noise on the system will be discussed. In the last part of the course upper bounds on the rate at which a process can transmit information will be obtained. Preq: E&CE 317.

416, 616 Introduction to Modern Control Systems 3(3,0) Introduction to modern control systems utilizing state space techniques: state space, state vector differential equation, fundamental matrix, stability, analysis of discrete-time and nonlinear systems, design and synthesis, optimum control systems including adaptive and learning control systems. Preq: E&CE 302.

417, 617 Software Design 3(3,0) An indepth study of methodologies and techniques used throughout the software development cycle including analysis, design, implementation, and testing. Additional topics include software development tools and software project management techniques. Preq: CPSC 110, E&CE 299 or ENGR 180: E&CE 250.
420, H420, 620 Power Systems Analysis I 3(3,0) A study of electric power system terminology, components, and operation. Subjects covered include power, reactive power, and power factor; three-phase systems; transmission lines; per unit representation; transformers; synchronous machines; introduction to load flow; economic dispatch, fault analysis, and stability. Preq: E&CE 301, 340.

421, 621 Electrical Machinery 3(2,2) Characteristics of dc and ac machines are studied with emphasis on steady state and nonlinear operation. The two-hour workshop offers exercises in instrumentation, operation, and control. Preq: E&CE 301, 341.


423, 623 Design for Large-Scale Integration Functions 3(3,0) Introduction to design principles and techniques for devices and functional elements used in large-scale integrated circuits. Emphasis on MOS digital circuits and new types of high-packing density bipolar circuits. Survey of current LSI applications. Impact of manufacturing technology on performance, cost, and reliability included. Preq: E&CE 321.

424, 624 Power Systems Analysis II 3(3,0) Continuation of E&CE 420. Topics introduced in E&CE 420 are covered in more detail and depth. Subjects covered are load and flow studies, optimum operating strategies, fault analysis, transient stability, and the control problem. System modeling and computer solution of power system problems are included. Preq: E&CE 420.

425, 625 Microcomputers I 3(2,2) Survey of currently available microprocessors, indepth study of the architecture of more prominent microprocessors, hardware and software design, use of microcomputer-development system, design projects. Preq: E&CE 201 and 412 or 250.

426, 626 Digital Computer Design 3(3,0)S Design of high speed ALU’s, control and timing circuitry, memory systems. 1/0 circuitry. Microprogrammed computer design using bit-slice microprocessors. Current hardware topics related to computer design. Hands-on design experience. Use of logic analyzer for system debugging. Preq: E&CE 201, 250.

427, 627 Operational Amplifiers 2(2,0)S The fundamentals, design and applications of the operational amplifier. Preq: E&CE 321 or equivalent.

428, 628 Communications Theory I 3(3,0)F A course in modern communications theory. Topics covered are Fourier transforms, power spectra, correlation, signals in linear networks, amplitude modulation, frequency modulation, sampling and pulse modulation. Preq: E&CE 317.

429, 629 Computer Organization 3(3,0) A course in computer organization and architecture. Topics include a review of logic circuits, bus structures, memory organization, interrupt structures, arithmetic units, input-output structures, state generation, central processor organization, control function implementation, and data communication. Preq: CPSC 230 or E&CE 250, or consent of instructor.

430, 630 Communications Theory II 3(3,0)S Continuation of E&CE 428 with emphasis on the statistical properties of signals. Topics covered are random signals and noise, signal space and continuous channels, digital data systems, optimum detection theory. Preq: E&CE 317, 428.

431, 631 Digital Electronics 3(2,2) Electronic devices and circuits of importance to digital computer operation and to other areas of electrical engineering are considered. Active and passive waveshaping, waveform generation, memory elements, switching, and logic circuits are some of the topics. Experimentation with various types of circuits is provided by laboratory projects. Preq: E&CE 321.

432, 632 Instrumentation 3(3,0)F Theory and analysis of transducers and related circuits and instrumentation. Generalized configurations and performance characteristics of instruments will be considered. Transducer devices for measuring physical parameters such as motion, force,
torque, pressure, flow, and temperature will be discussed. *Preq:* E&CE 321 or consent of department head.

434, 634 **Power Electronics** 3(3,0)F A study of electronic devices and systems which are designed to control or regulate large amounts of power. Included are SCR applications to inverters, motors controls, high-current power supplies, frequency converters, etc. Also, high-current switching systems, voltage stabilizers, and other power applications of electronics are considered. *Preq:* E&CE 321.

435, 635 **Communications Circuits** 3(3,0)S Communication circuits used in amplification, modulation, detection and other signal processing in modern communication systems. Recent developments in electronic devices, such as integrated circuits, will be considered as circuit components along with other solid state and vacuum electronic devices. *Preq:* E&CE 321.

436, 636 **Radiation and Wave Propagation** 3(3,0)F A study of the theoretical and practical aspects of transmission lines, wave-guides, plane electromagnetic waves, and antennas. Smith chart applications and impedance matching considerations are included. *Preq:* E&CE 341.

437, 637 **Laser Technology and Applications** 3(3,0)S Design and operating principles of gas and solid-state lasers in engineering terms. Applications of lasers to computers, communications, holography, measurements and bioengineering are presented. Demonstrations and special projects are used to supplement the theoretical presentations.

438, 638 **Computer Communications** 3(3,0) Digital data transmission techniques, modems and communications channels, communications software and protocols, multiprocessors and distributed processing. Concurrency and cooperation of dispersed processors. *Preq:* E&CE 322, 351, 429.

441, 641 **Theory of Sequential Machines** 3(3,0) Introduction to the theory of computing covering the topics of sequential machines, sequential machine decomposition, formal language theory and Turing machines.

450, 650 **Computer System Design Project** 2(0,4) A project-oriented course which brings together computer engineering students into teams or project groups. Assignments are made to each group which are designed to help develop an appreciation for individual and creative thinking as well as team effort. *Preq:* E&CE 425, 426, or consent of instructor.

451, 651 **System Design Project** 2(0,4)F,S A project-oriented course which brings together electrical engineering students of dissimilar training into teams or project groups. Assignments are made to each group which are designed to help develop an appreciation for individual and creative thinking as well as team effort. *Coreq:* E&CE 410.

452, 652 **Programming Systems** 3(3,0)S A second course in programming languages and systems. Topics include assemblers, compilers and syntactical methods; string manipulation and list processing; concepts of executive programs and operating systems; introduction to time-sharing systems. *Preq:* E&CE 250; 352 is recommended.

454, 654 **Physiological Control Systems** 3(2,2) Control theory will be introduced to the level that frequency domain analysis and computer simulation using CSMP can be used. Emphasis will be placed on computer modeling of the pulmonary, renal, hormonal, and cardiovascular systems. *Preq:* Senior standing, consent of instructor.

460, 660 **Computer-Aided Analysis and Design** 3(3,0)F Principles and methods suited to the solution of engineering problems on the digital computer. Topics include widely used methods for the solution of the systems of algebraic and/or differential equations which arise in the modeling of engineering systems, data approximation and curve fitting, continuous system simulation languages, and design-oriented programming systems. *Preq:* E&CE 301 or consent of department head.

461, 661 **Analog/Hybrid Computation and Simulation** 3(2,2)F Topics include nonlinear modeling, function generation, signal processing, and an introduction to hybrid computing. *Preq:* E&CE 301, 330, or consent of department head.

467, 667 Introduction to Digital Signal Processing 3(3,0) Discrete time signals and systems, z-transforms, digital filter design techniques, properties and computation techniques of the discrete Fourier transform. *Preq:* E&CE 302.

470, 670 Computer Applications for Nonengineers 3(3,0) Introduction to computers for nonengineering majors. History of computers: algorithms; introduction to programming in BASIC; hardware components: simulation: applications in urban and government systems, humanities, education, behavioral sciences, arts, and other areas: impact of computers on society; computers and the future. Not open to engineering majors. *Preq:* Senior standing.

471, 671 Microcomputer Applications in Medical Instrumentation 3(3,0) A study of state-of-the-art techniques of analysis and monitoring in clinical and research environments. Electrocardiographic (ECG) and electroencephalographic (EEG) analysis and monitoring will be discussed in detail. Automation of other clinical facilities such as intensive care and the catheterization laboratory will be considered. Microcomputer design considerations will be emphasized. *Preq:* E&CE 425 or equivalent microcomputer experience.

472, 672 Microcomputer Systems Applications 3(2,2) Intended for students who do not have an extensive background in computers or electronics but want to know how to utilize low cost microcomputer systems. Topics include components of microcomputers, programming methods, applications, and special input-output methods. (Not open to Electrical and Computer Engineering majors.) *Preq:* Consent of instructor.

491, 691 Selected Topics 1-3(1-3,0) Study of current and new technical developments in electrical engineering. *Preq:* Consent the department head.

701 Special Problems 1-3

702 Electric Motor Control 3(3,0)

801 Analysis of Linear Systems 3(3,0)

803 Linear Control Theory and Design 3(3,0)

804 Optimal Control Theory 3(3,0)

807 Power System Analysis Techniques 3(3,0)

809 Semiconductor Materials 3(3,0)

812 Digital Control Systems 3(3,0)

817 Power System Transients 3(3,0)

819 Detection and Estimation Theory 3(3,0)

820 Theory of Communications I 3(3,0)

821 Theory of Communications II 3(3,0)

822 Information Theory 3(3,0)

823 Integrated Circuit Technology 3(3,0)

825 Solid-State Electronics 3(3,0)

830 Electromagnetics 3(3,0)

840 Physics of Semiconductor Devices 3(3,0)

841 Distributed Computing and Networks 3(3,0)

842 Advanced Computer Architecture 3(3,0)

843 Computer Graphics 3(3,0)

844 Digital Signal Processing 3(3,0)
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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>845</td>
<td>Computer System Design and Operation</td>
<td>3(3,0)</td>
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<tr>
<td>846</td>
<td>Digital Processing of Speech Signals</td>
<td>3(3,0)</td>
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<tr>
<td>847</td>
<td>Digital Image Processing</td>
<td>3(3,0)</td>
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<tr>
<td>850</td>
<td>Computation and Simulation</td>
<td>3(3,0)</td>
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<tr>
<td>851</td>
<td>Theory and Design of Digital-Analog Machines</td>
<td>3(3,0)</td>
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<tr>
<td>852</td>
<td>Digital Computers and Information Processing</td>
<td>3(3,0)</td>
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<tr>
<td>853</td>
<td>Computer Data Displays</td>
<td>3(3,0)</td>
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<td>855</td>
<td>Artificial Intelligence</td>
<td>3(3,0)</td>
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<td>856</td>
<td>Pattern Recognition</td>
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<td>857</td>
<td>Coding Theory</td>
<td>3(3,0)</td>
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<td>858</td>
<td>Automata Theory</td>
<td>3(3,0)</td>
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<td>870</td>
<td>Biosystems Analysis</td>
<td>3(3,0)</td>
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<tr>
<td>890</td>
<td>Special Problems in Electrical and Computer</td>
<td>1-3(1-3,0)</td>
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<td>891</td>
<td>Master's Research. Credit to be arranged.</td>
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<tr>
<td>893</td>
<td>Selected Topics in Electrical and Computer</td>
<td>1-3(1-3,0)</td>
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<tr>
<td>991</td>
<td>Doctoral Research. Credit to be arranged.</td>
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**ENGINEERING (ENGR)**

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<tr>
<th>Course Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>110</td>
<td>Engineering Problems Workshop</td>
<td>1(0,2)</td>
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<tr>
<td>180</td>
<td>Engineering Concepts</td>
<td>3(2,2)</td>
</tr>
<tr>
<td>220</td>
<td>Technology in the Modern World</td>
<td>3(3,0)</td>
</tr>
<tr>
<td>250</td>
<td>Systems Internationale—The Modern Metric System</td>
<td>1(1,0)</td>
</tr>
<tr>
<td>330</td>
<td>Engineering Aspects of Energy Systems</td>
<td>3(3,0)</td>
</tr>
<tr>
<td>455</td>
<td>The Role of Engineering in Technology Assessment</td>
<td>3(3,0)</td>
</tr>
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*Preq: Sophomore standing or consent of instructor.*

*Preq: ENGR 220, one year of physical science, or consent of instructor.*

*Preq: Senior standing.*
491 Seminar 1-3(1-3.0) A study of the dynamic role of engineering in relationship to man and his environment. Topics not covered in formal courses will be presented to keep students abreast of today's rapidly changing technology. \textit{Preq:} Consent of instructor.

**ENGINEERING GRAPHICS (EG)**

\textbf{Associate Professors:} L. H. Jameson, J. R. McCravy, Jr., D. L. Ryan

101 Freehand Sketching 1(0,3) Principles of technical sketching, including the development of skills in technical lettering and freehand orthographic and pictorial drawing.

105 Engineering Drawing 2(1,3) A course in engineering drawing using the following procedures and techniques: lettering, use of instruments, plats, traverses, contour plotting and mapping, profile sections, and chart drawing.

109 Engineering Graphics 2(1,3) A course for the introduction of engineering graphics as a problem-solving tool. Areas of study include theory of orthographic points, lines, planes, and solids; sectional views; dimensioning; and design drawings.

110 Engineering Design Graphics 2(1,3) Continuation of EG 109. Emphasis is placed on graphical analysis as a means for evaluating a design. Units of study include descriptive and vector geometry, graphical statistics, and computer graphics. \textit{Preq:} EG 109 or equivalent.

310 Computer Aided Graphics 3(3,0) The use of automated graphic devices and systems are presented through a computer format for successful operation, digitizing, plotting, and display of engineering drawings. Upon completion, the student should be proficient in preparing and storing software such as that used in conjunction with the IBM 370 and CALCOMP digital plotter. \textit{Preq:} E&CE 299 or equivalent and either ME 201 or EG 109 or equivalent.

410 Computer Aided Design Graphics 3(3,0) Continuation of EG 310 with special emphasis on sculptured surfaces. The process involves translation from a designer's sketch, to an engineering drawing, to a model, and finally to a three-dimensional computer display. The student will learn how to apply the theory of computer-aided design (CAD) graphics to the solution of product design problems. \textit{Preq:} EG 310.

**ENGINEERING MANAGEMENT (EMGT)**


910 Seminar in Operations Management 1-3(1-3.0)

911 Seminar in Decision Theory 1-3(1-3.0)

912 Seminar in Financial Analysis 3(3.0)

913 Management Systems Analysis 3(3.0)

991 Doctoral Research. Credit to be arranged.

**ENGINEERING MECHANICS (EM)**


201, H201 Engineering Mechanics: Statics 3(3.0) Forces and force systems and their external effect on bodies, principally the condition of equilibrium. The techniques of vector mathematics are employed, and the rigor of physical analysis is emphasized. \textit{Preq:} PHYS 122. \textit{Coreq:} MTHSC 206.

211  **Particle Mechanics: Statics and Dynamics 3(3,0)** Force and force systems and their effect on particles; the conditions of equilibrium and the kinematics and kinetics of particle motion. The techniques of vector mathematics are employed, and the rigor of physical analysis is emphasized. *Preq:* MTHSC 206, PHYS 122.

304, H304  **Mechanics of Materials 3(3,0)** The relationships between external loads on solid bodies or members and the resulting internal effects and dimension changes, including the derivation of rational formulas for stresses and deformations and the identification and use of important mechanical properties of engineering materials. *Preq:* EM 201, MTHSC 206.

305  **Mechanics of Materials Laboratory 1(0,3)** Theoretical relationships considered in EM 304 are verified. Students observe the behavior under load and the failure of engineering materials; identify and evaluate mechanical properties of materials important to design and manufacturing processes; and are acquainted with various testing methods, testing machines, and instruments. *Preq:* Must be accompanied or preceded by EM 304.

320, H320  **Fluid Mechanics 3(3,0)** The behavior of fluids at rest or in motion, including the study of fluid properties. Emphasis is placed upon a rational, analytical approach from which are developed basic principles of broad applicability to all fields of engineering. *Preq:* EM 202 or 211.

322  **Fluid Mechanics Laboratory 1(0,3)** The principles developed in EM 320 are verified and demonstrated. Familiarization with orderly techniques in organizing and reporting results of experimental investigations and with the use of instruments and equipment is afforded. *Preq:* Must be accompanied or preceded by EM 320.

425, 625  **Advanced Strength of Materials 3(3,0)** Topics in strength of materials not covered in EM 304. Three-dimensional stress and strain transformations, theories of failure, shear center, unsymmetrical bending, curved beams, and energy methods. Other topics such as stress concentrations and fatigue concepts are treated as time permits. *Preq:* EM 304.

450, 650  **Mechanical Vibrations 3(3,0)** Mathematical analysis of physical problems in the vibration of mechanical systems. Topics include linear-free vibrations, forced vibrations, and damping in single degree of freedom systems, transient vibrations, critical speeds and whirling of rotating shafts, dynamic balancing, and multidegree of freedom systems with lumped parameters. *Preq:* EM 202, 304, MTHSC 208.

470, 670  **Experimental Stress Analysis 3(2,3)** Experimental analysis of static and dynamic stress fields. Emphasis is on the techniques required to obtain data and the theoretical analysis required for proper interpretation. Methods and instrumentation associated with strain gages (including transducer applications), Moiré grids, brittle coatings, photoelasticity, and photoelastic coatings are studied. *Preq:* EM 304 and consent of instructor.

829  **Energy Methods and Variational Principles 3(3,0)**

831  **Theory of Elasticity I 3(3,0)**

832  **Theory of Elasticity II 3(3,0)**

834  **Principles of Structural Stability 3(3,0)**

845  **Intermediate Dynamics 3(3,0)**

891  **Master’s Research. Credit to be arranged.**

991  **Doctoral Research. Credit to be arranged.**
ENGINEERING TECHNOLOGY (ET)


207 Survey of Industrial Engineering Technology 3(3,0) An introduction to the industrial engineering technologist’s role in modern industrial enterprises. Topics such as industrial organization, production planning and control, personnel management, plant layout, manufacturing systems analysis, and work standards are included.

211 Electrical Circuits I 3(2,3) A study of direct and alternating current circuits. Circuits theorems are introduced in the DC and AC coverage. Emphasis is placed on steady-state conditions and power relationships in circuits with sinusoidal excitations. Magnetic circuits and AC/DC machinery theory are introduced. Preq: Consent of instructor.

212 Electrical Circuits II 4(3,2) Continuation of ET 211. A thorough coverage of polyphase circuits is included. Preq: ET 211.

241 Statics and Strength of Materials 3(3,0) Resolution of force systems, static equilibrium, centroids and center of gravity, friction, static analysis of structures. Mechanics of deformable bodies including stress, deformation and material properties in tension, compression and shear. Preq: Consent of instructor.


245 Applied Kinematics and Dynamics 4(3,3) Graphical analysis of displacements, velocities and accelerations in translation, rotation and general plane motion. Newton’s laws of motion are covered in conjunction with force analysis of cams, gears and gear trains, and mechanisms commonly encountered in the design of machines. Preq: CPSC 110 and ET 241 or equivalent.

295 Problems in Technology 3(3,0) The application of basic college mathematics, including differential and integral calculus, to problems found in a broad range of categories corresponding to the Engineering Technology curriculum requirements. Major categories covered include electrical, mechanical, heat power, and processes considerations. Preq: MTH 108 or equivalent.

301 Manufacturing Processes 3(2,3) Study of methods of conversion of raw materials into finished products. Includes basic terminology, interpretation and use of engineering plans, impact of production volume, and manufacturing control. Various manufacturing processes including material removal, casting, joining and forming of materials, and associated measurement techniques are examined. Preq: EG 109 or equivalent.

304 Methods and Standards 3(2.3) Fundamentals relating to work methods design and analysis. Includes study of techniques necessary for determining efficient work methods. Work measurement as a basis for control of costs and scheduling. Preq: Junior standing.

321 Elements of Electronics 3(2,3) Theory and operation of electronic circuits and control with emphasis on equipment for industrial application. Preq: ET 211.


323 Electrical Engineering Technology Laboratory 1(0,3) The course is intended to illustrate theory covered in previous electrical engineering technology courses, to develop experimental techniques, to interpret data and results, and to develop basic skills in technical report writing. Preq: ET 321.

331 **Electrical Machinery 4(3,2)** Coverage includes the theory of operation and application of DC and AC machines and transformers. External characteristics are depicted from the machine equivalent circuit. *Preq:* ET 212.

341 **Mechanical Engineering Technology Laboratory 1(0,3)** The course is intended to illustrate theory covered in previous mechanical engineering technology courses, to develop experimental technique, to interpret data and results, and to develop basic skills in technical writing. *Preq:* ET 241.

343 **Applied Fluid Mechanics 3(2,3)** Principles of fluid properties, fluid statics, fluid flow, dimensional analysis, ideal flow, compressible flow, measurements and equipment. *Preq:* ET 241 or equivalent.

351 **Applied Thermodynamics I 3(3,0)** First and second laws of thermodynamics, thermodynamic properties, thermodynamic processes, and elementary heat transfer. *Preq:* Consent of instructor.

352 **Applied Thermodynamics II 3(2,3)** Internal combustion engines, gas turbines, air compressors, flow in nozzles, refrigeration and steam power plant cycles, and gas mixtures. *Preq:* ET 351.

361 **Industrial Application of Statistics 3(3,0)** Application of statistical principles of analysis and control to production processes, studies of process capabilities, quality control, work sampling, reliability analysis, and machine interference. *Preq:* EXST 301 or equivalent.

365 **Industrial Process Measurement and Control 3(2,3)** An applied approach to industrial control theory. Electronic, pneumatic, mechanical, and hydraulic measurement and control devices are studied. Techniques are discussed for analyzing process control problems and selecting proper measuring and controlling equipment in control system design. *Preq:* Junior standing.

375 **Materials of Industry 3(3,0)** The technological applications of ceramic, metallic, polymeric, and composite materials to a variety of industrial environments. Guidelines are given for the selection of materials based upon material properties, economic considerations, and typical applications as related by case histories.

403 **Process Planning and Value Analysis 3(3,0)** Study of the techniques of manufacturing and technology applied to industrial operations. Value analysis concepts and techniques are introduced. Emphasis is placed on decision-making for process and equipment selection including capital investment analysis. Particular attention is given to surveying current literature. *Preq:* ET 301 or consent of instructor.

404 **Advanced Methods and Standards 3(2,3)** Synthesis of effective work methods using a predetermined basic motion-time system. Methods-time measurement is covered in detail. Standard data development and administration. Linear and multiple regression analysis for time formula development. *Preq:* ET 304, IM 408, or consent of instructor.

405 **Plant Layout and Material Handling 3(2,3)** Fundamentals underlying the planning of factory layout for new products and increases in production volume. Layout by product and process. Scale model, template, and other planning techniques. Materials handling analysis and equipment decisions. *Preq:* ET 301 and IM 408, or consent of instructor.


435 **Electrical Power Systems 3(2,2)** A study of the generation, transmission, and distribution of electrical energy. Includes economic consideration of power plant operation, protective relaying, transformers, per unit system, and symmetrical components. *Preq:* ET 331.
452 Power Production and Utilization 3(3,0) A course designed to apply the student's background developed in the study of thermodynamics and mechanics to the solution of problems encountered in thermal and hydraulic power systems and their industrial applications. Topics covered are energy processing, steam, internal combustion, hydropower sources, and economics of energy application. *Preq:* ET 241, 351, or equivalents.

455 Heating and Air-Conditioning 4(3,2) Psychrometric properties and processes; heating and cooling load calculations; selection and layout of major equipment for heating systems and air-conditioning systems, refrigeration, and automatic controls. *Preq:* ET 351.

461 Machine and Component Design 3(2,3) Basic instruction in the design and analysis of machine and machine components with emphasis on realistic and functional application. Kinematic and dynamic characteristics of the mechanical system together with wear, fatigue, structural soundness, safety, and others will be a major consideration of the analysis. *Preq:* EG 110, ET 245.

462 Mechanical Systems Design 3(2,3) Continuation of ET 461. Integration of standard and custom-designed components into complete, functional, mechanical systems. A total systems concept including power requirements drive specifications, controls, and economic considerations will be emphasized. *Preq:* ET 461.

488 Human Factors Technology 3(2,3) A study of human characteristics and limitations as they affect the design of operating systems. Application of the human factors data base including anthropometric data and behavioral and physiological research to practical design problems involving the work environment, tools and equipment, and consumer products. *Preq:* ET 361, MTHSC 203, or equivalent.

490 Selected Topics in Engineering Technology 1-3(1-3,0) A comprehensive study of any timely or special topic in engineering technology not covered in other courses. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

491 Technical Project Identification and Specification 1(0,3) A preparatory course for Engineering Technology majors starting their technical design project, including faculty consultations, seminars, field trips, literature search, project identification and specification, and proposal writing. *Preq:* Consent of instructor.

492 Technical Design Project 1(0,3) A senior technical design project performed in consultation with one or more faculty advisers. Collaboration with representatives of industry, government agencies, or community institutions is encouraged. A final written technical report, with evidence of extensive development and/or laboratory performance and tests, is required. *Preq:* ET 491.

**ENGLISH (ENGL)**


100 English Fundamentals 3(3,0) Drill in basic writing skills: mechanics, spelling, syntax, usage, dialect, sentence clusters, and paragraphing. Required of all freshmen who do not make a satisfactory score on the SAT verbal.
101, H101 English Composition 3(3,0) Training in correct and effective expression, in brief expository essays; review of the fundamentals of grammar and punctuation; instruction in common expository methods.

102, H102 English Composition 3(3,0) Continued emphasis on correct and effective expression; training in the organization and writing of the research report. Preq: ENGL 101.

111 English for Foreign Students 3(3,2) A special course for students learning English as a second language. Intensive study and drill in American English pronunciation and listening comprehension. Required of all foreign students who do not make a satisfactory grade on screening examinations in oral English.

H200 Literature and the Related Disciplines 3(3,0) Studies in the relation of literature to such disciplines as art, medicine, science, or the military. Topics vary from semester-to-semester. Proficiency in composition must be demonstrated. The course may be repeated once for credit. Preq: ENGL 101, 102, and approval of the Honors Council.

202 The Major Forms of Literature 3(3,0) A study of the basic structures and elements of fiction, poetry, and drama, including literary and critical theory, with readings in American, British, and world literature. Proficiency in composition must be demonstrated. Preq: ENGL 101, 102.

203, H203 Survey of English Literature I 3(3,0) Chief British authors and works from Beowulf to the Romantic period. Proficiency in composition must be demonstrated. Preq: ENGL 101, 102.

204, H204 Survey of English Literature II 3(3,0) Chief British authors and works from the Romantic period to 1945. Proficiency in composition must be demonstrated. Preq: ENGL 101, 102.

205, H205 Survey of American Literature I 3(3,0) American literature to the Civil War, with emphasis on major writers. Proficiency in composition must be demonstrated. Preq: ENGL 101, 102.

206, H206 Survey of American Literature II 3(3,0) American literature from the Civil War to 1945, with emphasis on major writers. Proficiency in composition must be demonstrated. Preq: ENGL 101, 102.

207 Survey of World Literature I 3(3,0) Translations of continental European literature from Homer to the Renaissance (together with some Asian classics), with emphasis on major authors. Proficiency in composition must be demonstrated. Preq: ENGL 101, 102.

208 Survey of World Literature II 3(3,0) Translations of continental European literature from the seventeenth century to the present (together with some Asian classics), with emphasis on major writers. Proficiency in composition must be demonstrated. Preq: ENGL 101, 102.

209 Contemporary American and British Literature 3(3,0) A study of selected writers of American and British literature since 1945. Proficiency in composition must be demonstrated. Preq: ENGL 101, 102.

217 Vocabulary Building 3(3,0) Development of a useful discriminating vocabulary for writing, speaking, and reading. Student notebooks and proficiency quizzes. Preq: ENGL 101, 102.

231 Introduction to Journalism 3(3,0) Instruction and practice in writing for mass media; editorial responsibilities. Preq: ENGL 102.

232 Introduction To Broadcasting 3(3,0) The history and scope of radio and television broadcasting in America.

300 Journalism Workshop 1(1,0) Responsibilities and duties of students editing uncensored publications; criticism of student publications. Open only to members of publication staffs. Preq: ENGL 102.

301 Public Speaking 3(3,0) Practical training in public speaking; an introduction to parliamentary procedure; practice in preparing, delivering, and evaluating short speeches. Preq: Sophomore standing.
302 Persuasion 3(3,0) The theories and art of ethical oral persuasion. The composition and delivery of speeches of a persuasive nature to convince, to stimulate, and to actuate. *Preq:* Sophomore standing.

303 Voice and Diction 3(3,0) Practical training in speech, with emphasis on clarity, vocal variety, and tone quality. *Preq:* Sophomore standing.

304 Advanced Composition 3(3,0) Supervised writing for students of advanced standing, each student undertaking projects according to his interest: some attention to reports, business letters, research methods and materials. Weekly papers and some larger exercises. Limited enrollment. *Preq:* Sophomore English.

305 Oral Interpretation of Literature 3(3,0) Analysis and oral interpretation of selected poetry and prose; training in development of effective tone production. *Preq:* Sophomore standing.

306 Forensic Laboratory 1(0,3) Organized preparation for participation in college speech activities. Intercolligate, campus, and community programs.

307 Argumentation and Debate 3(3,0) The basic principles of argumentation with emphasis on developing practical skills in argumentative speech. The role of the advocate in contemporary society and an analysis of selected significant debates in U.S. history. *Preq:* Sophomore standing.

308 Principles of Acting 3(2,3) The fundamentals of acting; basic stage techniques; exercises in interpretation, improvisation, characterization; experience in supervised performance. *Preq:* Sophomore standing.

309 Directing for the Stage 3(3,0) Directing and staging techniques for the proscenium stage; exercises in composition, movement, picturization; experience in direction of scenes. *Preq:* Sophomore standing.

310 Survey of the Theatre 3(3,0) The historical perspective and understanding of the mutual responsibilities of playwright, director, actor, technician, and spectator in the theatre. *Preq:* Sophomore standing.

311 Theatre Laboratory 1(0,3) Practical work in technical theatre on a production designed for public presentation. *Preq:* Sophomore standing.

313 Discussion and Group Leadership 3(3,0) Techniques of small group communication; the role of leadership in parliamentary and other deliberative bodies. *Preq:* Sophomore standing.

314 Technical Writing 3(3,0) Intensive training in the fundamentals of technical writing: reports, letters, and memoranda. *Preq:* Sophomore English.

320 Principles of Stage Design 3(2,3) Theory and practice of stage design and technology. *Preq:* Sophomore standing.

321 Reporting for the News Media 3(3,0) Practical experience in gathering and writing news and feature copy for the media, concentrating on print journalism; examination of the role of the modern journalist; laws governing the profession; journalistic ethics. *Preq:* ENGL 231 or consent of instructor.

322 Mythology 3(3,0) A study of the great myths of the world with an emphasis on their applications to literature. *Preq:* Sophomore standing.

323 Folklore 3(3,0) A study of folklore with an emphasis on such considerations as the folktale, folk songs and ballads, folk heroes, and folk superstitions and remedies. *Preq:* Sophomore standing.

333 The Structure of Fiction 3(3,0) An introduction to the creative writing and critical study of prose fiction. *Preq:* Sophomore standing.

334 The Structure of Poetry 3(3,0) An introduction to the creative writing and critical study of poetry. *Preq:* Sophomore standing.
335 **Film 3(3,0)** An examination of the film medium as an art form: its history, how films are made, why certain types of films (westerns, horror movies, and so forth) have become popular, and how critical theories provide standards for judging film. *Preq:* Sophomore standing or consent of instructor.

336 **Advanced Studies in Film 3(2,3)** Continued study of film theory and aesthetics, with application of that knowledge to the making of a film. *Preq:* ENGL 335 and consent of instructor.

338 **Popular Culture 3(3,0)** An examination of the nature, functions, history, and impact upon American society of best sellers, popular magazines, television, movies, and other like phenomena. *Preq:* Sophomore standing.

339 **Science Fiction 3(3,0)** Readings in science fiction from the seventeenth century to the present, with special emphasis on writers since Verne and Wells. *Preq:* Sophomore standing.

340 **Black American Literature 3(3,0)** Black American literature from its beginning to the present. A critical examination of essays, short stories, novels, drama, and poetry produced by the Black American. *Preq:* Sophomore standing.

351 **Children’s Literature 3(3,0)** Wide reading in prose and verse suitable for children in elementary grades. *Preq:* Sophomore standing.

352 **Adolescent Literature 3(3,0)** Wide reading in prose and verse suitable for children in secondary schools. *Preq:* Sophomore standing.

360 **Speech Communication 3(3,0)** Consideration of the major areas of study in speech communication, including argumentation, discussion, listening, mass communication, oral interpretation, persuasion, public speaking, and psychology. *Preq:* Sophomore standing.

362 **Speech in the Elementary Classroom 3(3,0)** The development of oral communication skills in children and the use of speech improvement activities to motivate spontaneous, accurate self-expression. *Preq:* Sophomore standing.

363 **Speech for Teachers 3(3,0)** A performance course in the communication needs of the professional educator: listening, group discussion, speech and drama activities, conferences, using the media, and micro-teaching. *Preq:* Sophomore standing.

402, 602 **The English Language 3(3,0)** Studies in English usage and the historical development of the language. *Preq:* Sophomore English.

403, 603 **Composition for Teachers 3(3,0)** Practical training in teaching composition: finding workable topics, organizing and developing observations and ideas, evaluating themes, and creative writing. *Preq:* Sophomore English.

404, 604 **The Structure of Modern English 3(3,0)** Structural linguistic analysis; principles of phonology, morphology, and syntax as related to traditional, structural, and transformational grammars. Recommended for English teachers. *Preq:* Sophomore English.

405, 605 **Shakespeare 3(3,0)** A study of selected tragedies, comedies, and history plays of Shakespeare. Required of all English majors. *Preq:* Sophomore English.

406, 606 **Studies in Shakespeare 3(3,0)** Special topics in Shakespeare as selected by instructors. *Preq:* Sophomore English.

409, 609 **Chaucer 3(3,0)** Chaucer as an artist: the “Prologue” for historical and linguistic orientation; “The Canterbury Tales,” “House of Fame,” “Parliament of Fowls,” and “Troilus and Criseyde” as art forms. *Preq:* Sophomore English.

410, 610 **Medieval English Literature 3(3,0)** Selected works of Old and Middle English literature, exclusive of Chaucer. *Preq:* Sophomore English.

413, 613 Classical Drama 3(3,0) Selected reading in the dramatic literature of classical Greece and Rome. *Preq:* Sophomore English.

416, 616 Modern Drama 3(3,0) Principles and progress of drama from Ibsen to the present; analysis of representative plays; critical reports; discussion of trends in contemporary drama. *Preq:* Sophomore English.

422, 622 American Literature I 3(3,0) Major American authors and movements from the Colonial period to the Civil War. *Preq:* Sophomore English.

423, 623 American Literature II 3(3,0) Major American authors and movements from the Civil War to the early twentieth century. *Preq:* Sophomore English.

424, 624 American Literature III 3(3,0) Major American authors and movements of the twentieth century. *Preq:* Sophomore English.

425, 625 The Romantic Period 3(3,0) Readings from the poetry and critical prose of Blake, Wordsworth, Coleridge, Byron, Shelley, Keats, and other representative figures. *Preq:* Sophomore English.

427, 627 The Victorian Period 3(3,0) Reading from the poetry and nonfiction prose of selected Victorian authors, including works of Carlyle, Tennyson, Browning, Arnold, and other representative figures. *Preq:* Sophomore English.

431, 631 The Restoration and Eighteenth Century 3(3,0) Readings in Dryden, Swift, Pope and Dr. Johnson. *Preq:* Sophomore English.

435, 635 Southern Literature 3(3,0) The intellectual and literary achievement of the South from 1607 to the present, with emphasis upon the writers of the nineteenth century. *Preq:* Sophomore English.

436, 636 Milton and His Age 3(3,0) The development of Milton's thought and art in relation to his times and to the writings of his contemporaries. *Preq:* Sophomore English.


438, 638 Twentieth Century Poetry 3(3,0) The modern tradition in English and American poetry from Yeats to the present; relevant critical essays. *Preq:* Sophomore English.

439, 639 Twentieth Century Fiction 3(3,0) American and British novelists of the twentieth century. *Preq:* Sophomore English.

440, 640 Applied Literary Criticism 3(3,0) Major critical approaches to literature. *Preq:* Sophomore English.

443, 643 Seventeenth Century Poetry and Prose 3(3,0) A survey of British authors of the seventeenth century other than Shakespeare and Milton. *Preq:* Sophomore English.

445, 645 Renaissance Nondramatic Literature 3(3,0) Tudor and Elizabethan poetry, prose fiction, translations, essays, and criticism. *Preq:* Sophomore English.

446, 646 Tudor-Stuart Drama 3(3,0) Selected readings in non-Shakespearean dramatic literature of the sixteenth and seventeenth centuries. *Preq:* Sophomore English.

447, 647 The American Novel 3(3,0) A survey of the most significant forms and themes of the American novel from its beginnings to 1900. *Preq:* Sophomore English.

448, 648 American Humor 3(3,0) Native American humor of the nineteenth and twentieth centuries. *Preq:* Sophomore English.

450 Fiction Workshop 3(3,0) A workshop in the creative writing of prose fiction. *Preq:* ENGL 333 or consent of instructor.

451 Poetry Workshop 3(3,0) A workshop in the creative writing of poetry. *Preq:* ENGL 334 or consent of instructor.
452, 652 Creative Writing for Teachers 3(3,0) A structured approach to the study of fiction and poetry from the writer's perspective, this course is designed for those who plan to teach creative writing. Students will write both fiction and poetry as well as critical papers. Preq: ENGL 333, 334, or consent of instructor.

461, 661 Studies in English Literature to 1700 3(3,0) Selected readings in English literature from the beginnings to 1700, with emphasis on social and intellectual backgrounds. Preq: Sophomore English.

462, 662 Studies in English Literature Since 1700 3(3,0) Selected readings in English literature from 1700 to the present, with emphasis on social and intellectual backgrounds. Preq: Sophomore English.

H470 Senior Division Honors English 3(3,0) An intensive study of a period, topic, genre, or figure. Papers, reports, reading list, examination. May be repeated by arrangement with the department. Preq: Sophomore English and approval of the Honors Council.

481 Directed Reading 1-3(1-3,0) Class and tutorial work for students with special interests or projects in American, British, or European literature outside the scope of existing courses. May be repeated by arrangement with the department. Preq: Junior standing.

482 Special Topics in Literature 3(3,0) A study of special topics in English not covered in other courses. Specific title will be announced when offered. Preq: Sophomore English.

485 Advanced Acting 3(2,3) The study and practice of acting styles and techniques, including those for period plays, musicals, and nonproscenium contemporary forms. Preq: ENGL 308 or consent of instructor.

486 Advanced Stage Direction 3(2,3) Study of production practices, problems, and techniques of style and composition, including those for period plays, musicals, and plays presented in nonproscenium staging areas. Preq: ENGL 309 or consent of instructor.

487 Advanced Stage Design 3(2,3) Study and practice in stage design, including drafting, graphics, drawing, rendering, scene painting, and light plotting. Preq: ENGL 320 or consent of instructor.

751 Children's Literature for Teachers 3(3,0)
761 English Literature for Teachers 3(3,0)
801 Studies in the Teaching of English: Modern Grammar and Rhetoric 3(3,0)
802 Studies in Middle English Literature 3(3,0)
803 Studies in Renaissance English Literature 3(3,0)
804 Studies in Neoclassic and Romantic Literature 3(3,0)
805 Studies in Victorian and Modern English Literature 3(3,0)
810 Studies in Colonial and Revolutionary American Literature 3(3,0)
811 Studies in Romantic and Realistic American Literature 3(3,0)
812 Studies in Modern American Literature 3(3,0)
820 Studies in Theoretical and Applied Literary Criticism 3(3,0)
825 Studies in Literary Genres 3(3,0)
830 Studies in Linguistics 3(3,0)
840 Studies in World Literature 3(3,0)
881 Directed Reading 3(3,0)
890 Introduction to Research 1(1,0)
891 Master's Research. Credit to be arranged.
ENTOMOLOGY (ENT)


200 Insects 2(2,0) An introduction to insects; their various relationships with man, other animals and plants. The general nature of this course makes it beneficial to all students regardless of specialty.

301 General Entomology 3(2,3) A general introduction to entomology with emphasis on anatomy, metamorphosis, and description of the most common insect species. Methods of control are introduced and current control practices are explained for some of the most important species.

308 Apiculture 3(2,3) A detailed study of the honey bee and its economic importance in pollination and honey production. Attention will be given to bee behavior, colony management, equipment, honey plant identification, and honey production and processing. Preq: BIOL 104, 106, and consent of instructor.

401, H401, 601 Insect Pests of Ornamental Plants and Shade Trees 3(2,3) Recognition, biology, damage and control of insect pests of woody and other ornamental plants and shade trees. Preq: ENT 301.

402, H402, 602 Fruit, Nut, and Vegetable Insects 3(2,3) Common insect pests of the following are studied: peaches, apples, grapes, pecans, sweet corn, cole crops, cucurbits, potatoes, sweet potatoes, peas, and beans. Primary emphasis is placed on life histories, identification of destructive forms, recognition of damage, and current control measures. Preq: ENT 301.

403, H403, 603 Field Crop Insects 3(2,3) Insect pests of the more important field crops are studied. Primary emphasis is placed on life histories, identification of destructive stages, recognition of damage and current control measures. Preq: ENT 301.

404, H404, 604 Structural, Industrial and Household Insects 3(2,3) Recognition, biology, damage, and control of food, stored products, household, structural, and industrial pests. Preq: ENT 301.


410, 610 Insect Taxonomy 3(1,6) The identification of the principal families of the major orders of adult insects. Laboratory work consists of intensive practice of such identification; lecture material deals with necessary theoretical discussion of taxonomic features observed in the laboratory. Preq: ENT 405 or consent of instructor.

412, 612 Field and Museum Entomology 3(0,9) Practical aspects of gathering, sorting, and curating insects. Students participate in an intensive insect-collecting expedition for two weeks in the Southeastern States. Students will become acquainted with insect habitats and collecting methods. The remainder of the summer session will be devoted to curatorial preparation of collected material. Limited enrollment. Preq: ENT 410 and consent of instructor.

420, 620 Toxicology of Insecticides 3(2,3) Concepts of insecticide toxicology; principles of insecticide action; toxicological and pharmacological effects in insects and higher animals, safety, current regulations governing the use of insecticides. Preq: ENT 301.

455, H455, 655 Medical and Veterinary Entomology 3(2,3) Insects and their arthropod relatives which are of economic importance in their effect on man and animals. Preq: ENT 301 or consent of instructor.

461 Special Problems in Entomology and Economic Zoology 1-3 Research problems in selected entomological and economic zoology areas to provide the student with experiences in research planning, techniques of development and presentation of research results. Preq: Consultation with and consent of the appropriate staff member.
462 Seminar 1(1,0) Literary search and oral presentation of current entomological topics.

468, 668 Introduction to Research 2(1,3) Principles, developments and changes in research methods related to certain fields of biological and agricultural research. The students obtain practice in experimental techniques, scientific writing and the use and maintenance of various instruments and equipment.

469, H469, 669 Aquatic Insects 3(1,6) Identification, life history, habitats, and interrelationships of aquatic insects; techniques of qualitative field collecting; important literature and research workers. Preq: ENT 301 or consent of instructor.

470, H470, 670 Insect Physiology 3(2,3) An introduction to the physiological systems of insects including structure as related to function. Emphasis will be on digestion, nutrition, reproduction, respiration, excretion, and nervous and hormonal systems as they affect growth and development in insects. Preq: ENT 301 or consent of instructor.

480, H480, 680 Insect Pathology 3(2,3) The study of insect diseases including those caused by viruses, rickettsiae, bacteria, fungi, protozoa, and nematodes will be covered in this course. The effects of diseases on insect populations and the use of pathogens in insect control will also be considered in detail. Preq: ENT 301 or consent of instructor.

490 Practicum 1-4 Supervised entomological learning opportunity, providing highly individualized experiences to complement other programs and courses. Must be prearranged at least two months in advance. Must file written report midway during enrollment period and at its conclusion. Must appear for oral evaluation at the end of the period. Preq: Junior standing and consent of instructor.

808 Taxonomy of Immature Insects 3(1,6)

809 Recent Advances in Entomology 1(1,0)

812 Entomological History and Literature 1(1,0)

840 Insect Ecology 3(2,3)

853 Applied Systematics 3(2,3)

856 Medical Entomology 3(2,3)

860 Insect Pest Management 3(3,0)

861 Insect Toxicology 3(2,3)

863 Special Problems in Entomology 3-6

870 Advanced Insect Physiology 3(2,3)

891 Master's Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

ENVIRONMENTAL SCIENCE (ENSC)

Professor: A. R. Abernathy, R. F. Borgman, W. P. Williams, Jr.; Associate Professor: R. O. Hegg, M. G. Johnson

431, 631 Public Health Administration 3(3,0) A course designed to prepare one for a career in the environmental sciences, with positions in public health and pollution control. Topics included are public health organizations and regulations, public relations, psychology of public health administration, and the use of the communications media in educating the public on health problems.

432 Inspection Methods in Water and Solid Waste 3(2,3) Methods of disposal of liquid and solid wastes will be emphasized in regard to environmental quality control. Treatment plant methods will be discussed. Inspection techniques for adequate treatment is a basic approach.

471, 671 Man and His Environment 2(2,0) The interaction of man with his environment will be surveyed. Factors such as urbanization, population growth, pathogens, disease vectors, ionizing radiation, sewage disposal, and noise control will be considered. The effects of envi-
vironmental contacts with air, water, food, and solid and liquid wastes will be emphasized. *Preq:* Consent of instructor.

472, 672 **Environmental Planning and Control** 2(2,0) Application of planning and control to effective environmental quality improvement. Water supply and treatment, wastewater treatment and disposal, solid waste disposal, air pollution abatement, and land use and zoning will be considered from the standpoint of control. Not intended for graduate students in engineering. *Preq:* Consent of instructor.

**ENVIRONMENTAL SYSTEMS ENGINEERING (ESE)**

*Professors:* A. R. Abernathy, B. C. Dysart III, T. M. Keinath, *Head*; L. G. Rich, P. B. Zielinski; *Associate Professor:* T. J. Overcamp; *Assistant Professors:* A. W. Elzerman, T. E. Pollock

401, 601 **Environmental Engineering** 3(3,0) An introduction to the field of environmental engineering. Topics include environmental phenomena, impact of pollutants in the aquatic environment, solid-waste management, air-pollution control, radiological health, and simple water-treatment systems. *Preq:* Junior standing in engineering or consent of instructor.

402, 602 **Water and Waste-Treatment Systems** 3(3,0) A study of the fundamental principles, rational design considerations, and operational procedures of the unit operations and processes employed in water and waste treatment. Both physiochemical and biological treatment techniques will be discussed. An introduction to the integration of unit operations and processes into water and waste treatment systems. *Preq:* EM 320 or consent of instructor.

430, 630 **Air Pollution Engineering** 3(3,0) An introductory course in air pollution and its control. Topics include air pollutants and effects, sources, dispersion models, engineering controls, and air quality legislation. *Preq:* Senior standing in engineering or physical sciences.

443, 643 **Environmental Engineering Chemistry I** 3(3,0) Fundamental principles of physical and analytical chemistry applied to natural waters and the treatment of waters and wastewaters. Chemical thermodynamics, chemical kinetics, acid-base equilibria, solubility equilibria, complex equilibria, and electrochemistry are several topics that are examined with emphasis on graphical techniques. *Preq:* One year of General Chemistry.

444, 644 **Environmental Engineering Chemistry Laboratory I** 1(0,3) Laboratory exercises in basic analytical methods used in water-quality studies. EPA prescribed wet-chemical analytical techniques are demonstrated using samples of water or wastewater. These include residue analysis, phosphorus, chemical oxygen demand, nitrogen forms, alkalinity, acidity, pH, hardness, dissolved oxygen, and biochemical oxygen demand. *Preq:* One year of General Chemistry.

470, 670 **Water Resources Engineering** 3(3,0) Covers range of water resources development with emphasis on engineering aspects of traditionally important purposes of flood control, navigation, hydroelectric power, and reclamation. Stresses comprehensive, multiple purpose, and systems aspects of modern water resources development and management. Includes introduction to use of mathematical modeling and digital simulation in water resources planning and project design.

491 **Selected Topics in Environmental Engineering** 1-3 A study of the dynamic role of environmental engineering in maintaining environmental quality. A comprehensive study of any phase of environmental engineering. *Preq:* Consent of department head.

701 **Special Problems** 1-6(1-6,0)

802 **Principles of Water-Treatment Systems** 4(4,0)

803 **Laboratory in Principles of Water-Treatment Systems** 1(0,3)

804 **Design and Operation of Water-Treatment Systems** 4(4,0)

805 **Laboratory in Design and Operation of Water-Treatment Systems** 1(0,3)

806 **Integrated Problems in Water-Treatment Systems** 2(2,0)
Description of Courses

831 Air Quality Monitoring 3(2,3)
832 Air Pollution Meteorology 3(3,0)
833 Air Pollution Control Systems 3(3,0)
847 Advanced Topics in Environmental Engineering Chemistry 2(2,0)
848 Environmental Engineering Chemistry II 2(2,0)
849 Environmental Engineering Chemistry Laboratory II 2(0,6)
850 Stream and Estuarine Analysis 3(3,0)
852 Ecological Models 3(2,3)
856 Pollution of the Aquatic Environment 3(3,0)
857 Pollution of the Aquatic Environment Laboratory 1(0,3)
861 Environmental Systems Engineering Seminar 0-1(1,0)
862 Environmental Quality Case Study 1(0,3)
875 Water Resources Planning 3(3,0)
876 Water Resources Systems 3(3,0)
881 Special Problems 1-4
883 Selected Topics in Environmental Engineering 1-4
884 Selected Topics in Environmental Engineering 1-4
891 Master's Research. Credit to be arranged.
991 Doctoral Research. Credit to be arranged.

EXPERIMENTAL STATISTICS (EXST)


301 Introductory Statistics 3(2,2)F, S, SS Basic concepts and methods of statistical inference; organization and presentation of data, elementary probability, measures of central tendency and variation, tests of significance, sampling, simple linear regression and correlation. The role of statistics in interpreting research, and the general application of the methods are stressed.

462, 662 Statistics Applied to Economics 3(3,0)F Continuation of EXST 301 with emphasis on statistical methods used in the collection, analysis, presentation and interpretation of economic data. Special attention is given to time series analysis, the construction of index numbers and the designing of samples for surveys in the social science fields. *Preq:* EXST 301.

801 Statistical Methods 4(3,3)
803 Regression and Least Squares Analysis 3(3,0)
804 Sampling 3(3,0)
805 Design and Analysis of Experiments 3(3,0)

FINANCE (FIN)


306, H306 Corporation Finance 3(3,0) The organization and operation of corporations with emphasis on the nature and influences of the various sources of funds. *Preq:* ACCT 202 or equivalent with consent of instructor.

307 Principles of Real Estate 3(3,0) A course to acquaint the student with the theories, practices, and principles which govern real estate markets. Major emphasis will be placed on
three areas: (1) specifics of real estate brokerage, property rights and ownership; (2) making real estate investment decisions; and (3) financing real estate investments. Preq: FIN 306 or consent of instructor.

308 Financial Institutions and Markets 3(3,0) A study of financial institutions and markets with emphasis upon the role of financing American industry. Preq: ECON 302, FIN 306.


402, 602 Capital Budgeting 3(3,0) A study of the cost of capital expenditures with emphasis on selecting the appropriate investments from the standpoint of the firm. Preq: FIN 306 or consent of instructor.

404 Seminar in Finance 3(3,0) An examination of current issues and controversies in financial management. Lectures, student reports, selected readings, and visiting speakers. Preq: FIN 308, 310.

408 Commercial Bank Management 3(3,0) A detailed study of operational, theoretical, and regulatory factors affecting the commercial banking industry and its relationship to the business and public sectors. Preq: FIN 308.

410 Research in Finance 1-3 A directed research course for students interested in a career in finance. Research topic selected by student and approved by instructor. A formal research paper is required. Preq: FIN 306 and consent of instructor.

FOOD SCIENCE (FDSC)
Professors: J. C. Acton, J. J. Janzen, J. T. Lazar, Jr., C. V. Morr, W. P. Williams, Jr., Head; Associate Professors: R. G. Bursey, M. G. Johnson; Assistant Professors: J. R. Ice, S. H. Rizvi

101 Epochs In Man's Struggle For Food 1(1,0) A study of significant developments in food preservation methods and the impact each had on man's struggle for food.

201 Man and His Food 2(2,0) A study of food and food products with emphasis on nutrients, nutrient needs, and the relationship between nutrient intake and health. Also discussed are food additives, nutritional awareness (to include nutrition labeling), product development, food protection, food resources, and the influence of processing on nutritional quality of food.

202 Introduction to Packaging 2(2,0) An introduction to the technological concepts involved in creating a package and its basic functions. Closure and sealing materials and methods, packaging and labeling laws, ecological impacts, and future of packaging are identified.

212 Man's Food Resources 2(2,0) Food material resources with reference to quality preservation, processing, and nutritional requirements. The role of science and technology in the modern food industry is emphasized. The need for food standards and grades is explained, and the functions of regulatory agencies are discussed.

305, H305 Dairy and Food Engineering 3(2,3) A study of the basic engineering principles and their application to the dairy and food processing operations. The relationship between engineering principles and fundamentals of food processing is emphasized. Topics include material and energy balance, electricity, steam, refrigeration, heat transfer, fluid mechanics, evaporation, water and waste treatment.

401, H401, 601 Food Chemistry I 4(3,3) The basic composition, structure, and properties of food and the chemistry of changes occurring during processing utilization. Preq: BIOCH 210 or consent of instructor.

402, H402, 602 Food Chemistry II 4(3,3) Application of theory and procedures for quantitative and qualitative analysis of food ingredients and food products. Methods for protein, moisture, lipid, carbohydrate, ash, fiber, rancidity, color and vitamin analyses and tests for functional properties of ingredients are examined. Preq: BIOCH 210 or consent of instructor.
232 Description of Courses

403, 603 Food Preservation and Processing I 3(3,0) Food preservation and processing by refrigerated and frozen storage, thermal processing and pasteurization, dehydration and concentration, fermentation, radiation, microwave heating and chemical preservatives. Preq: Physics and organic chemistry or biochemistry.

404, 604 Food Preservation and Processing II 3(3,0) Principles of food preservation applied to flow processes, ingredient functions, and the importance of composition and physical characteristics of foods related to their processing. Product recalls and product development concepts. Preq: Physics and organic chemistry or biochemistry.

405, 605 Food Preservation and Processing Laboratory I 1(0,3) Laboratory exercises on preservation methods, equipment utilized, and processes followed in food manufacture. Coreq: FDSC 403.

406, 606 Food Preservation and Processing Laboratory II 1(0,3) Continuation of FDSC 405 with greater emphasis on processes followed in food manufacture. Coreq: FDSC 404.

417 Seminar 1(1,0) Literature research and oral presentation of current food science topics.

418 Seminar 1(1,0) Literature research and oral presentation of current food science topics.

420, H420 Special Topics in Food Science 1-3(1-3,0) A comprehensive study of special topics in food science not covered in other courses. Special emphasis will be placed on independent investigations of contemporary developments. Preq: Consent of instructor.

422, 622 Quality Assurance and Sensory Evaluation 2(2,0) Principles of food quality assurance programs with emphasis on the elements of sensory evaluation testing, sampling, inspections, federal and trade standards grades, records and EVOP procedures.

424, 624 Quality Assurance and Sensory Evaluation Laboratory 1(0,3) Continuation of FDSC 422. The mechanics of quality assurance laboratory methods with emphasis on sensory evaluation panel testing, scoring, kinesthetic properties, and grade-quality measurements.

464, 664 Food Packaging Systems 3(3,0) Characteristics and application of various materials and systems used in the packaging of foods. Engineering properties of the materials and methods used to measure such properties are emphasized. Consideration is given to packaging systems for specific food applications. Preq: Consent of instructor.

466, 666 Food Packaging Systems Laboratory 1(0,3) Laboratory and field exercises on food packaging operations and packaging materials. Method to evaluate the physical and chemical properties of packaging materials will be emphasized. Preq: Consent of instructor.

491 Practicum 1-4 Supervised experiential opportunities in the food industry. Preq: Junior standing and consent of department head.

801 Topical Problems in Food Science 1-3(1-3,0)
802 Food Enzymology 2(2,0)
803 Food Fermentations 2(2,0)
804 Thermal Processing of Packaged Foods 3(3,0)
805 Food Rheology 2(2,0)
806 Chemistry of Food Colors and Pigments 2(2,0)
807 Food Colloids 2(2,0)
808 Food Flavors 2(2,0)
851 Food Science Seminar 1(1,0)
852 Food Science Seminar 1(1,0)
891 Master's Research. Credit to be arranged.

FORESTRY (FOR)


101 Introduction to Forestry 1(1.0)F An informative sketch of forestry, forests, and forestry tasks of the nation; education and career opportunities for foresters.

102 Introduction to Forestry 1(1.0)S Continuation of FOR 101.

205 Dendrology 4(3.3)F Classification, nomenclature, and identification of the principal forest trees of the United States, their geographical distribution, ecological requirements, and economic importance. Field identification of native trees and commonly planted exotics in the Piedmont and surrounding areas. Preq: BIOL 103, 105 or consent of instructor.

206 Silvics 4(3.3)S A study of the nature of forests and forest trees, how they grow, reproduce, and their relationships to the physical and biological environment. Preq: AGRON 202, BIOL 103 and 105, FOR 205 or consent of instructor.

221 Wood Properties I 3(2.3)F The formation of wood in forest trees, gross and minute characteristics of wood, defects in wood, variability in wood. Preq: BIOL 103, 105 or consent of instructor.

222 Wood Properties II 3(2.3) Wood in relation to moisture, heat, sound, light, and electricity; mechanical properties of wood; standard testing procedures for wood. Preq: FOR 221 or consent of instructor.

251 Forest Plants 2(Summer Camp)SS Identification of principal native forest understory plants by vegetative and floral characteristics; their site requirements and forest-type associations with emphasis on successional patterns; and their value for man and wildlife. The preparation of a field herbarium is required of all students. Preq: BIOL 103 and 105, FOR 205 or consent of instructor.

252 Forest Engineering 2(Summer Camp)SS Field and drafting practice in mapping, traversing boundaries, and road location; use of surveying equipment and techniques. Preq: CE 201, EG 105 or consent of instructor.

253 Forest Mensuration 4(Summer Camp)SS Practical application of field techniques including timber cruising, measuring tree heights and volumes, constructing volume tables and boundary line surveys. Preq: CE 201, EG 105, FOR 205 or consent of instructor.

254 Forest Products 1(Summer Camp)SS A tour of the forest products industry of South Carolina with an emphasis on those products and processes of some distinction or special interest.

255 Secondary Wood Products 1 SS A tour of the secondary wood products industries with an emphasis on industries too far from Clemson for the usual half-day field trips during regular sessions. Preq: FOR 205 or consent of instructor.

301 Forest Entomology 3(2.3)F Insects of economic importance to forests, forest products and shade trees, and their role in the practice of good forest management as well as their significance in the natural environment. Preq: FOR 205, 206, or consent of instructor.

302, 602 Forest Mensuration 3(2.3)S A practical application of statistical and mensurational techniques in forest management. Preq: EXST 301, FOR 253 or consent of instructor.

304, 604 Forest Economics 3(3.0)S Economic problems and principles involved in the utilization of forest land and timber and in the distribution of forest products; cost analysis of integrated forest operations. Preq: ECON 211, MTHSC 106, or consent of instructor.

305 Elements of Forestry 2(2.0)F, S A compendium of forestry subjects providing a broad view of the forest environment as it relates to ecology, management and utilization of forests, especially those of South Carolina. Not open to Forest Management majors. Preq: BIOL 103 and 105 or consent of instructor.
Wood and Wood Fiber Identification 2(1,3)S  Macroscopic and microscopic identification, properties, and uses of selected economically significant timbers. *Preq:* BIOL 103 and 105, or consent of instructor.

Elements of Forestry Laboratory 1(0,3)F, S Field and laboratory exercises in the fundamentals of forest land management considered in FOR 305. *Preq:* Registration in FOR 305.

Aerial Photographs in Forestry 3(2,3)F An introduction to photographic measurements, aerial photo-interpretations, mapping, and timber estimating. *Preq:* CE 201, Forestry Summer Camp, or consent of instructor.

Silviculture 4(3,3)S Theory and practice of establishing, maintaining, and harvesting forest stands in accordance with ecological and economic principles. *Preq:* FOR 206, Forestry Summer Camp, or consent of instructor.

Reproduction of Forest Trees 2(1,3)S, Odd-numbered years. Methods of reproduction in forest trees; seed propagation, propagation by rooting and grafting techniques; environmental requirements for propagation, media, and materials. The course covers theory and practical instruction, making use of indoor and outdoor propagating beds. Limited enrollment. *Preq:* FOR 205 or consent of instructor.

Forest Ecology 2(2,0)S A study of the forest ecosystem stressing the interrelationships between the living and nonliving components of the forest environment. Energy flow, nutrient and hydrologic cycles, meteorological and soil factors will also be considered. Not open to Forestry majors.

Wood Chemistry 3(2,3) The chemistry of the major components of wood, distribution of the wall components in wood, chemical processing of wood, and cellulose-derived products. *Preq:* CH 102 or consent of instructor.

Wood Processing I 3(2,3) Wood seasoning principles and practices, seasoning defects, wood preservation principles and practices, fire-retardant treatments. *Preq:* FOR 221 or consent of instructor.

Wood Processing II 3(2,3) Machining and preparation of wood for processing, wood adhesives, wood finishes. *Preq:* FOR 327 or consent of instructor.

Harvesting Forest Products I 2(1,3) Harvesting methods and costs. Major emphasis on survey of logging methods and equipment. *Preq:* Senior standing or consent of instructor.

Forest Soils Seminar 1(1,0)S A study of forest soil characteristics with respect to site evaluation, forest fertilization, planting problems, watershed management, tree-soil-microorganism interactions, and trafficability. *Preq:* Junior standing or consent of instructor.

Forest Influences 2(2,0)F An examination of the effect of forests and forestry on climate, water, soil, organisms, and humans. Reviews forest influences in relation to current environmental legislation and debate. *Preq:* FOR 206 or consent of instructor.

Forest Pathology 3(2,3)F Nature and control of diseases of forest trees and their products. Will focus upon the relation of disease control to silviculture, management, and forest products utilization. *Preq:* FOR 310 or consent of instructor.

Multiple-Use Forestry 3(3,0)F A study of the demands placed on forests for a variety of products and uses, and how these can and must be reconciled in planning the management of each forest. *Preq:* Senior standing or consent of instructor.

Harvesting Forest Products II 3(2,3) An application of engineering and cost analysis techniques to the evaluation of the forest transport system and various harvesting situations. *Preq:* FOR 401 or consent of instructor.
412, 612 Forest Protection 2(2,0)S Prevention and suppression of forest fires; their effect upon the environment and people; factors affecting fire behavior; and use of fire in resource management. Preq: Senior standing or consent of instructor.

414, 614 Management Plans 1(0,3)S Analysis of factors entering into forest working plans of several forestry organizations; preparation of a preliminary management plan of a sample area. Preq: FOR 417.

415, 615 Forest Wildlife Management 3(2,3) Principles, practices, and problems of wildlife management with emphasis on upland forest game species. Habitat manipulation through use of appropriate silvicultural practices in association with other techniques are evaluated. Preq: FOR 310 or consent of instructor.

416, 616 Forest Policy and Administration 2(2,0)S Development of public and private forest policy in the United States; administrative and executive tasks in forestry; principles of organization, personnel management, budgeting, and decision making. Preq: FOR 304 or consent of instructor.

417, 617 Forest Management and Regulation 4(3,3)F Correlation of production factors and yields of forests; regulation of cuts and growing stock in sustained yield management. Preq: Forestry Summer Camp, FOR 304, 310 or consent of instructor.

418, 618 Forest Valuation 3(3,0)S Capital investments in forestry and the returns derivable from them; valuation of land, timber, and other resources associated with forestry; appraisal of damage and stumpage values. Preq: FOR 304 or consent of instructor.

419 Senior Problems 3(1-3,0) Problems chosen with faculty approval in selected areas of forestry. Preq: Senior standing.

420, 620 Forest Products 3(2,3)F Primary forest products including lumber, poles and piles, veneers and plywoods, secondary wood products; chemically derived products from wood including pulp and paper, distillation products, wood hydrolysis; miscellaneous and minor forest products. Preq: FOR 306, Forestry Summer Camp, or consent of instructor.

423, 623 Lectures in Forestry 2-4(2-4,0-3) Lectures in various fields of forestry delivered by the holders of the Visiting Professorship in Forestry.

424, 624 Forest Genetics and Tree Breeding 3(3,0)S Even-numbered years. History of genetics and breeding in forestry and its relation to silviculture; natural variation, hybridization and inheritance in forest trees; tree breeding objectives and methods. Preq: GEN 302 or equivalent, or consent of instructor.

429, 629 Wood Design 3(2,3)F The technical mechanical properties of wood; load analysis and design criteria; design of structural elements in wood. Preq: FOR 328 or consent of instructor.

430, 630 Composite Wood Materials 3(2,3) Manufacturing methods, physical and mechanical properties, and uses of wood-polymer composites, wood laminates, plywood, particleboard, fiberboard, reconstituted board products, structural sandwich panels, paper-base plastic laminates, and extruded and molded products. Preq: FOR 222, 328, or consent of instructor.

431, 631 Recreation Resource Planning in Forest Management 3(3,0)F Forest recreation is analyzed from two aspects: its effects on the physical and biological forest environment and on human participation and preferences. Various physiographic factors composing the forest site and techniques of properly managing these factors will be examined. Man's perspective and participation in forest recreation activities and his influence and impacts will be surveyed. Preq: Senior standing or consent of instructor.

432, 632 Forest Site Capability 2(2,0)S Analysis of use pressures on the forest land base and their effects on the capability of the forest to satisfy resource demands. Productivity and sensitivity of sites will be discussed. Preq: Senior standing in Forestry or consent of instructor.

433, 633 Merchandising of Forest Products 3(3,0) Merchandising practices employed in the forest products industries, emphasizing the lumber and pulp and paper industries. Preq: ECON 211, FOR 304, or consent of instructor.
434, 634  Foreign Woods and Their Properties  2(1,3)  The identification of commercially important foreign woods imported into the United States, their macroscopic and microscopic features, basic wood properties, and use.  *Preq:* FOR 221, 306. consent of instructor.

435, 635  Park and Forest Structures  2(2,0)  Selection, processing, protection, and maintenance of wood used in park and forest structures.  *Preq:* Senior standing or consent of instructor.

436, 636  Wood as an Energy Source  2(2,0)  A study of the availability, characteristics, and processing required for using wood and bark as a source of energy.  *Preq:* Senior standing or consent of instructor.

440, 640  Forest Wetland Ecology  5(3,6)SS  Coastal wetland forest types and sites are analyzed by physiographic types, soils, groundwater hydrology, flooding and species adaptability characteristics. The impact of silvicultural treatments on forest productivity, site, and water quality are evaluated for major forest types and sites. Course offered only at the Belle W. Baruch Forest Science Institute at Georgetown, S. C.  *Preq:* Senior standing or consent of instructor.

707  Special Problems  1-3(1-3,0)

801  Data Processing in Forestry Problems  3(2,3)

802  Advanced Mensuration  3(2,3)

803  Photo Interpretation  3(2,3)

804  Advanced Forest Economics  3(2,3)

805  Advanced Silviculture I—Forest Soils  3(3,0)

806  Advanced Silviculture II—Forest Tree Growth and Development  3(3,0)

807  Special Problems in Forestry. Credit to be arranged.

808  Seminar  1(1,0)

891  Master’s Research. Credit to be arranged.

**FRENCH (FR)**

*Professor:* H. E. Stewart,  *Head: Associate Professor:* R. R. McGregor, Jr.;  *Assistant Professors:* D. Y. Brannock, Jr., J. A. McNatt, J. B. Macy, J. B. Romeiser;  *Instructors:* D. J. Calvez, J. C. Rouse, R. Willingham

101, H101  Elementary French  4(3,1)  A course for beginners in which, through conversation, composition, and dictation, the fundamentals of the language are taught and a foundation is provided for further study and the eventual ability to read and speak the language. Three hours a week of classroom instruction and one hour a week in the language laboratory.

102, H102  Elementary French  4(3,1)  Continuation of FR 101: three hours a week of classroom instruction and one hour a week in the language laboratory.


202, H202  Intermediate French  3(3,0)  While attention is paid to writing and speaking French, more stress is laid on the rapid reading of more difficult French prose than in the earlier courses.  *Preq:* FR 201.

205  Elementary French Conversation and Composition  3(3,0)  Intensive oral and written training in French through conversation groups, speeches, written composition, and controlled vocabulary acquisition. Required of all French majors and minors. May be taken concurrently with FR 202, 301 or 302.  *Preq:* FR 201.

209  Introduction to French Phonetics  3(3,0)  A study of the fundamental principles of the pronunciation of French through the use of the International Phonetic Alphabet and recordings. This course may not be used toward the satisfaction of the foreign language requirement in the Bachelor of Arts curriculum.  *Preq:* FR 201 or equivalent.
299 Foreign Language Drama Laboratory 1(0,3) Participation in foreign language drama productions. No formal class meetings, but an average of three hours per week in a foreign language drama workshop for production. May be repeated for a total of three credit hours. *Preq: Consent of instructor directing the play.*

301 Survey of French Literature I 3(3,0) French literary movements and authors of the 19th and 20th centuries. *Preq: FR 202.*

302 Survey of French Literature II 3(3,0) French literary movements and authors from the Middle Ages through the 18th century. *Preq: FR 202.*

305 Intermediate French Conversation and Composition I 3(3,0) Practice in the spoken language, with stress on vocabulary building, pronunciation, intonation, and comprehension; written work to increase accuracy. Assignments in the language laboratory. *Preq: FR 202 or consent of department head.*

306 Intermediate French Conversation and Composition II 3(3,0) Continuation of FR 305, with additional emphasis on written composition. *Preq: FR 305 or consent of department head.*

307 French Civilization 3(3,0) A study of the significant aspects of the culture of France from its origins to the present. *Preq: FR 202 and 205 or consent of department head.*

310 French for Business and Industry 3(3,0) An introduction to the language of French business and industry, with emphasis upon writing and translating business letters and professional reports. Preparation toward the examination for the Certificat Pratique de Francais Commercial. *Preq: FR 202 or consent of department head.*

403 Twentieth Century French Prose and Poetry 3(3,0) The major literary themes and genres of the period and their influence upon other art forms. *Preq: FR 301 or 302.*

404 Twentieth Century French Drama 3(3,0) A survey of French drama and its relationship to other literary and art forms. *Preq: FR 301 or 302.*

405 Nineteenth Century French Romanticism 3(3,0) The Romantic movement as expressed in the works of Chateaubriand, Hugo, Mérimée, Vigny, Stendhal, Sand, and others. Readings, discussions, and reports. *Preq: FR 301 or 302.*

406 Nineteenth Century French Literary Movements 3(3,0) A study of genres representative of the literary theories which contributed to the great diversity of the literature, painting, and music of the period. *Preq: FR 301 or 302.*

407 Eighteenth Century French Literature 3(3,0) The principal literary figures of the 18th century, with particular emphasis on Voltaire and Rousseau. Selected works, discussions, and reports. *Preq: FR 301 or 302.*

408 Seventeenth Century French Literature 3(3,0) Major literary figures, themes, and forms of 17th century French literature. *Preq: FR 301 or 302.*

409 Advanced Grammar and Conversation 3(3,0) An intensive study of syntax and stylistics through composition and translations. *Preq: Senior standing or consent of department head.*

498 Independent Study 1-3(1-3,0) Directed study of selected topics in French literature, language, and culture. May be repeated for a maximum of six credits. *Preq: Consent of department head.*

499 Selected Topics in French Literature 3(3,0) Selected topics that have characterized French literature, language, and culture throughout the centuries. May be repeated for a maximum of six credits. *Preq: FR 301 or 302.*
GENETICS (GEN)

Professors: P. M. Burrows, G. R. Craddock, W. D. Graham, Jr., C. M. Jones, E. A. Rupert; Associate Professors: E. L. Kline, E. F. McClain, J. S. Rice; Assistant Professors: R. H. Hilderman, D. G. Yardley; Lecturer: P. B. Gibson

301 Genetics and Human Affairs 3(3,0)S SS Basic genetic principles emphasizing human heredity and the relationship of genetics to society. Discussion of chromosome abnormalities, inborn errors of metabolism, sex-related traits, genetic counseling, and other current genetic topics. Course is designed as an elective for students in nonbiological science majors. Will not substitute for GEN 302.

302, H302, 602 Genetics 4(3,3)F, S SS A basic course dealing with the fundamental principles of inheritance in prokaryotes and eukaryotes. Emphasis is given to Mendelian genetics, physical and chemical bases of heredity, inherited human abnormalities, population genetics and other facets of heredity. Preq: BIOL 103, 104, 105, 106, or consent of instructor.

305 Introductory and Molecular Genetics 4(3,3) A molecular approach to Mendelian genetics built upon the biochemical-molecular principles presented in BIOCH 301. Additional emphasis is placed on prokaryote genetics and eukaryote chromosome structure and regulation. Preq: BIOCH 301.

451, 651 Advanced Genetics 3(3,0)S Advanced study of the principles of general genetics. Topics emphasized are variations in chromosome number and structure, natural and induced mutations, extranuclear inheritance, recombination, control of gene activity, genes and development, genetics of behavior patterns, population genetics, systems of mating, genetics and man. Preq: GEN 302 or equivalent.

461, 661 Biometrical Genetics 3(3,0) Statistical methodology in the study of population genetics. Probability as applied to genetic systems, gene and zygotic frequencies, derivation of genetic expectations, forces which change gene frequency, inbreeding, estimation and testing of genetic parameters, partitioning of variance, responses to selection, and other statistical aspects of continuous variation. Preq: EXST 301, GEN 302, or equivalent.

701 Modern Developments in Genetics 3(3,0)
801 Cytogenetics 3(2,3)
806 Special Problems in Genetics 1-3(0,3-9)

GEOGRAPHY (GEOG)

Associate Professor: J. L. Arbera

101 Introduction to Geography 3(3,0) An introduction to the tools, language, methodologies, and basic concepts of geography as a social science.

301 Political Geography 3(3,0) The geographic basis for and the geographic problems of the modern state; the relevance of geographical patterns to international affairs. Preq: GEOG 101.

302 Economic Geography 3(3,0) The geographic conditions fundamental to the world's resources (agricultural, mineral, commercial, and industrial), and the conditions which affect the utilization, marketing, consumption, and strategic significance of those resources. Preq: GEOG 101.

GEOLOGY (GEOL)

Professors: P. K. Birkhead, V. S. Griffin, Jr., G. M. Haselton, D. S. Snipes; Assistant Professor: W. L. Mansker; Instructor: J. R. Wagner

101 Physical Geology 4(3,2) A study of the minerals and rock which compose the earth's crust, their origins and transformations. Emphasis is placed upon geological processes, both internal and external, by which changes are produced on or in the earth. Laboratory instruction
is provided in the interpretation of geologic processes through study of topographic maps. Field trips provide direct observation of processes and results.

102 Historical Geology 4(3,3) Evolution, both organic and inorganic, is traced from the beginning of the record through the present. Laboratory instruction and field trips provide practice in the identification and study of plants and animals which have left their record as fossils in the rocks of the earth’s crust. *Preq:* GEOL 101.

219 Geology for Foresters 3(3,0) A study of materials of the earth’s crust, processes of their origin and change; landforms, processes of their formation and destruction. Demonstration of materials is fully incorporated into lectures. Limited to students majoring in Forest Management or consent of instructor.

306, 606 Mineralogy 3(2,3) The student gains a working knowledge of crystallography and a comprehensive knowledge of determinative mineralogy. Identification of the minerals is based on their physical and chemical properties. *Preq:* GEOL 101.

309, H309, 609 Petrology 3(2,3) The genesis, evolution and classification of rocks through lectures, laboratory exercises, and field trips. The occurrences, chemical relationships, and distribution of rock types are emphasized. *Preq:* GEOL 306.

310, H310, 610 Optical Mineralogy 3(1,4) The purpose of this course is to enable the student to identify minerals under the microscope on the basis of their optical properties. *Preq:* GEOL 306.

313, 613 Stratigraphy and Sedimentation 3(3,0) The process by which sediments are eroded, transported, and deposited (sedimentation), with major emphasis on relationships of the area and time distribution of stratified rocks and their historical significances (stratigraphy). *Preq:* GEOL 101.

400, 600 Environmental Geology 3(3,0) A discussion-oriented introductory study of the relationships of man to his physical surroundings and the problems resulting from upsetting the established equilibria of geologic systems: man’s role as a geologic agent, environmental conservation and management.

402, H402, 602 Structural Geology 3(2,2) The diverse geological structures of the earth, their description, origin, and field recognition. Practical problems in interpreting geologic structures are utilized, in addition to theoretical considerations of the mechanics and causes of tectonism. *Preq:* GEOL 101.

403, H403, 603 Invertebrate Paleontology 3(2,3) A study of life of past geologic ages, as shown by fossilized remains of ancient animals, with emphasis on the invertebrates. *Preq:* GEOL 101 or consent of instructor.

404, H404, 604 Economic Geology 3(3,0) This course concerns the description and classification of ore deposits and commercial nonmetallic mineral deposits. The origin of mineral deposits and their occurrence is emphasized. Problem studies and field trips to nearby mines and quarries. *Preq:* GEOL 306.

405, 605 Geomorphology 4(3,3) A study of the surface features of the earth—their form, nature, origin, development, and the change they are undergoing. *Preq:* GEOL 101, 102, or consent of instructor.

407, 607 Quaternary Geology 3(2,2) Early concepts about glaciation. Types and distribution of glaciers today and during their maximum extent. Glacial erosion, transportation and ice-sculptured terrain features. Study of quaternary sediments and their chronology. Drainage changes, sea level fluctuations and crustal deformation. Detailed study of specific areas as time permits. Field trips.

408, 608 Geohydrology 3(3,0) Study of the hydrologic cycle, aquifer characteristics, theory of groundwater movement, mechanics of well flow, experimental methods, and subsurface mapping. *Preq:* GEOL 101, 102.
411, 611 Research Problems 1-3(0,3-9) A field, laboratory, or library study of an approved topic in geology. The topic would be one not normally covered in formal course offering, but may be an extension of a course. *Preq:* Senior standing in geology or consent of the department head.

412 Research Problems 3(0,9) Continuation of GEOL 411.

415, 615 Geology Practiced in Industry and Government 3(3,0) Geology's practical role, with a basic geology introduction for mathematics, economics, management, agronomy, and engineering students. Multidisciplinary, geologic-based problems are treated to enable students to apply themselves more effectively in geology-related positions in their disciplines. *Preq:* Senior or graduate standing, consent of instructor.

450 Seminar in Geology 1(1,0)F A survey of the current literature and ideas of geology through library research and preparation of a seminar lecture on a topic by each individual student. *Preq:* Junior standing.

451 Seminar in Geology 1(1,0)S A survey of the current literature and ideas of geology through library research and preparation of a seminar lecture on a topic by each individual student. *Preq:* Junior standing.

700 Earth Science I 3(2,3)

750 Earth Science II 3(2,3)

**GERMAN (GER)**

*Associate Professors:* M. M. Sinka, P. W. Wannamaker; *Assistant Professor:* J. M. Melton; *Instructor:* E. P. Arnold

101, H101 Elementary German 4(3,1) A course for beginners in which, through conversation, composition and dictation, the fundamentals of the language are taught and a foundation is provided for further study and the eventual ability to read and speak the language. Three hours a week of classroom instruction and one hour a week in the language laboratory.

102, H102 Elementary German 4(3,1) Continuation of GER 101; three hours a week of classroom instruction and one hour a week in the language laboratory.

201, H201 Intermediate German 3(3,0) A brief review of GER 101 and 102, with conversation, composition, and dictation, and the beginning of more serious reading of German prose in short stories and plays. *Preq:* GER 102.

202, H202 Intermediate German 3(3,0) Emphasis on reading nontechnical German prose more rapidly. Writing, speaking, and listening skills will continue to be developed. *Preq:* GER 201 or consent of department head.

205 Elementary German Conversation and Composition 3(3,0) Intensive oral and written training in German through conversation groups, speeches, written compositions, and controlled vocabulary acquisition. Recommended for all German majors. *Preq:* GER 201. *Coreq:* GER 202, 301, 302.

251 Scientific German 3(3,0) An alternate course to GER 202, especially for students in the sciences. Readings will be chosen from various fields. Grammar and syntax will be reviewed to ensure accurate translation, but stress will be on reading for understanding. *Preq:* GER 201 or consent of department head.

299 Foreign Language Drama Laboratory 1(0,3) Participation in foreign language drama productions. No formal class meetings, but an average of three hours per week in a foreign language drama workshop for production. May be repeated for a total of three credit hours. *Preq:* Consent of instructor directing the play.

301 Twentieth Century German Drama 3(3,0) Selected works from major German-speaking dramatists of the 20th century, including Brecht, Dürrenmatt, and Frisch. Required of German majors. *Preq:* GER 202 or consent of department head.
302  Twentieth Century German Prose and Poetry  3(3,0)  Selected prose and poetry from major 20th century German-speaking authors, including Rilke, Mann, Hesse, Kafka, and Boll. Required of German majors.  

   Preq: GER 202 or consent of department head.

305  Intermediate German Conversation and Composition  3(3,0)  Practice in the spoken language, with emphasis on vocabulary, pronunciation, and comprehension; written exercises for accuracy. Required of German majors.  

   Preq: GER 202. 205. or consent of department head.

307  German Civilization  3(3,0)  A study of significant aspects of the culture of the German-speaking peoples from their origins to the present.  

   Preq: GER 202 or consent of department head.

401  Studies in German Literature I  3(3,0)  Selected topics in German literature from the beginnings to 1832.  

   Preq: GER 301, 302, or consent of department head.

402  Studies in German Literature II  3(3,0)  A study of selected topics in 19th or 20th century German literature.  

   Preq: GER 301, 302, or consent of department head.

403  Studies in German Literature III  3(3,0)  A study of a major theme in German literature within a chosen time period or in the work of one major author. The themes may be subject- or genre-oriented.  

   Preq: GER 301, 302, or consent of department head.

411  Studies in the German Language I  3(3,0)  Advanced training in the spoken and written language with emphasis on vocabulary, syntax, and stylistics.  

   Preq: GER 305 or consent of department head.

412  Studies in the German Language II  3(3,0)  An indepth study of terminology and syntax for specific subject areas in business, in the liberal arts, and in the sciences.  

   Preq: GER 301, 302, 305, or consent of department head.

413  Studies in German Culture  3(3,0)  An intensive study of selected topics concerning cultural phenomena of the German-speaking nations.  

   Preq: GER 301, 302, 305. or consent of department head.

498  Independent Study  1-3(1-3,0)  Supervised study of selected topics in German literature, language, or culture.  

   Preq: Consent of the Head of the Department of Languages.

GRADUATE STUDIES (GS)

799  Comprehensive Studies  1-15

HISTORY (HIST)


101, H101  History of the United States  3(3,0)  The political, economic, and social development of the American people from the period of discovery to the end of Reconstruction.

102, H102  History of the United States  3(3,0)  The political, economic, and social development of the American people from the period of Reconstruction to the present.

172, H172  Western Civilization  3(3,0)  The political, economic, and social movements of Western civilization from ancient times to the seventeenth century.

173, H173  Western Civilization  3(3,0)  The political, economic, and social movements of Western civilization from the seventeenth century to the present.

198  Current History  1(1,0)  An examination of the major events and problem areas in the news with emphasis on their historical context and possible long-range significance. May be taken a total of three times for credit. Does not count toward the requirements of the major or minor in History.
300 History of Colonial America 3(3,0) The development of American institutions and customs in the period before 1776. Considerable emphasis is placed on the imperial relations between Great Britain and her colonies and upon the movement towards and the philosophy of the American Revolution.

301 American Revolution and the New Nation 3(3,0) A study of the various historical explanations leading to an understanding of the American Revolution, the establishment of the Nation under the Constitution, and the first decade of the new nation. Special emphasis will be placed upon developing an understanding of individual motivation and ideological development present during the last four decades of the eighteenth century.

302 Age of Jefferson and Jackson 3(3,0) The formation and growing pains of the new nation through the Federal and Middle periods of its history, with emphasis on economic and political development, the westward movement, and the conflicting forces of nationalism and sectionalism.

303 Civil War and Reconstruction 3(3,0) A study of the political, military, and social aspects of the sectional conflict and of the era of Reconstruction. Some emphasis will be placed on the historical controversies which the period has inspired.

304 Industrialism and the Progressive Era 3(3,0) A study of American society in the period between 1880 and the 1930's. This course emphasizes the effects of industrialization and urbanization on the American people.

305 United States Since 1933 3(3,0) Particular emphasis will be given to the Great Depression, World War II, the Cold War, and domestic developments in the 1950s and 1960s.

306 American Economic Development 3(3,0) The economic development of the United States from Colonial to recent times, emphasizing the institutional development of agriculture, banking, business and labor, and government regulation and policy.

307 Recent United States Diplomatic History 3(3,0) The history of American foreign policy from the late nineteenth century to the present, showing the rise of America's world interests and gradual involvement in global affairs. Emphasis is placed on the role of public opinion in foreign policy.

308 American Legal History 3(3,0) A survey of the American legal system in its historical perspective, from Colonial times to the present. Emphasis will be placed on the relationship between law and society: the way in which the practice of law changes American society and the way in which social development affected both the theory and practice of the law.

313 History of South Carolina 3(3,0) The political, economic, and social development of South Carolina from 1670 to the present.

314 History of the South 3(3,0) Origins and development of political, economic, and cultural institutions of the South from the Colonial period to the present, and the role of the South in the nation's development.

315 Black History in America 3(3,0) A study of the Afro-American experience in the United States, from the African past, through slavery, to the present.

331 Pre-Modern History of East Asia 3(3,0) A survey of the history of China and Japan from earliest times to the arrival of Europeans in the sixteenth century.

332 Modernization of East Asia 3(3,0) A survey of the history of China and Japan from the sixteenth century to the present, with emphasis on the impact of Western culture.

340 Ancient Americans 3(3,0) An introduction to the geography of the Western Hemisphere; origin of human life in the Americas; structure and accomplishments of the major pre-Columbian societies, with an emphasis on the rise and decline of the Classic civilizations; the impact of the European conquest; the formation of a new Ibero-American culture.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>HIST 341</td>
<td>Mexico and Middle America Since 1800</td>
<td>3(3,0)</td>
<td>An introduction to the geography of the region, origins and progress of the Independence movements and political, economic and social developments after 1825; current domestic and international problems.</td>
</tr>
<tr>
<td>HIST 342</td>
<td>South America Since 1800</td>
<td>3(3,0)</td>
<td>An introduction to the geography of the region; origins and progress of the Independence movements; political, economic and social developments after 1825; current domestic and international problems.</td>
</tr>
<tr>
<td>HIST 351</td>
<td>Ancient Near East</td>
<td>3(3,0)</td>
<td>A history of the peoples and civilizations of the Near East from the Sumerians to the establishment of Roman power in this region. Geography, mythology, religious and economic currents, as well as the methods and discoveries of archaeology will be included.</td>
</tr>
<tr>
<td>HIST 354</td>
<td>The Greek World</td>
<td>3(3,0)</td>
<td>A study of Greek civilization from its beginnings until the time of the Roman conquest, concentrating on the social institutions of the Greek city-states.</td>
</tr>
<tr>
<td>HIST 355</td>
<td>The Roman World</td>
<td>3(3,0)</td>
<td>The rise of Rome to world empire and the international civilization it dominated. Concentration on the nature of the political change from Republic to monarchy with particular emphasis on city life and the causes of its decline.</td>
</tr>
<tr>
<td>HIST 361</td>
<td>History of England to 1603</td>
<td>3(3,0)</td>
<td>The history of England to 1603.</td>
</tr>
<tr>
<td>HIST 363</td>
<td>History of England Since 1603</td>
<td>3(3,0)</td>
<td>Continuation of HIST 361.</td>
</tr>
<tr>
<td>HIST 370</td>
<td>Medieval History</td>
<td>3(3,0)</td>
<td>A survey of the period from the eclipse of Rome to the advent of the Renaissance, emphasizing human migrations, feudalism, rise of towns, and cultural life.</td>
</tr>
<tr>
<td>HIST 372</td>
<td>The Renaissance</td>
<td>3(3,0)</td>
<td>An examination of the transitional period of European civilization (ca. 1300-1500), with emphasis on institutional, cultural, and intellectual developments.</td>
</tr>
<tr>
<td>HIST 373</td>
<td>Age of the Protestant Reformation</td>
<td>3(3,0)</td>
<td>The evolution of Modern Europe (ca. 1500-1660), as affected by the Reformation, wars of religion, and growth of nation-states. The study will include intellectual advances and the beginnings of European expansion overseas.</td>
</tr>
<tr>
<td>HIST 374</td>
<td>Europe in the Age of Reason</td>
<td>3(3,0)</td>
<td>A study of the quest for order and the consolidation of the European state system between 1660 and 1789 with emphasis on the idea of absolutism, the question of French hegemony, and the synthesis of the eighteenth century Enlightenment.</td>
</tr>
<tr>
<td>HIST 375</td>
<td>Revolutionary Europe</td>
<td>3(3,0)</td>
<td>A history of Europe from the outbreak of the French Revolution through the Revolutions of 1848, with emphasis on the conflict between the forces of change and those of conservatism within the states and in Europe in general.</td>
</tr>
<tr>
<td>HIST 376</td>
<td>The Age of European Dominance</td>
<td>3(3,0)</td>
<td>A history of Europe from the midnineteenth century to the outbreak of the First World War, with emphasis on the social, economic, and political development of the European states and the forces of nationalism, imperialism, and liberalism.</td>
</tr>
<tr>
<td>HIST 377</td>
<td>Europe in Crisis, 1914 to the Present</td>
<td>3(3,0)</td>
<td>A study of the political, economic, and social institutions of the European peoples from 1914 to the present. Attention will be given to the world wars and to the collapse of the European state-system.</td>
</tr>
<tr>
<td>HIST 385</td>
<td>History of Russia to 1905</td>
<td>3(3,0)</td>
<td>A survey of Russian history from earliest times to 1905, emphasizing Kievan and Appanage Russia, the rise of the Moscow state, and Imperial Russia.</td>
</tr>
<tr>
<td>HIST 386</td>
<td>History of Russia Since 1905</td>
<td>3(3,0)</td>
<td>Continuation of HIST 385.</td>
</tr>
</tbody>
</table>

With departmental permission any 400-level course in history may be repeated one time for credit.

<table>
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<tr>
<th>Course Code</th>
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</thead>
<tbody>
<tr>
<td>HIST 400</td>
<td>Studies in United States History</td>
<td>3(3,0)</td>
<td>Topics and problems in the history of the United States from the Colonial era to the present.</td>
</tr>
</tbody>
</table>
440, 640 Studies in Latin American History 3(3,0) A consideration of selected and varied topics in Latin American history through readings, class discussions, and individual or group projects. Special attention will be given to the use of an inquiry or problem-solving method of historical analysis and to the cultivation of a comparative perspective.

450, 650 Studies in Ancient History 3(3,0) Selected topics in the field of ancient history ranging from pre-Biblical times to the fall of the Roman Empire.

460, 660 Studies in British History 3(3,0) An examination of selected themes, topics, or periods in British history from Anglo-Saxon times to the present.

470, 670 Studies in Early European History 3(3,0) Study of selected topics or themes in European history from the fall of the Roman Empire to the age of industrialization.

471, 671 Studies in Modern European History 3(3,0) Study of selected topics or problems in European history from the end of the Old Regime to the present.

492, 692 Studies in Diplomatic History 3(3,0) Selected topics and problems in international conflict and conflict resolution among nations. Concentration will usually be in twentieth century history.

493, 693 Studies in Social History 3(3,0) Studies in the ways people have earned their livings and lived their lives, individually and as communities, in the confines of different societies.

494, 694 Studies in Comparative History 3(3,0) Selected topics in comparative history, contrasting and comparing similar historic developments in different nations, geographic areas, or civilizations.

495, 695 Studies in the History of Ideas 3(3,0) Selected topics and themes in the development of ideas that have had an impact on the behavior of individuals and civilizations.

496, 696 Studies in Legal History 3(3,0) Study of selected problems in the development of law and the system of criminal and civil justice.

499 Independent Study 3(3,0) Study of selected problems in history under the direction of a faculty member chosen by the student. The student and faculty member develop a course of study designed for the individual student and approved by the head of the department prior to registration.

715 History of the Black American 3(3,0)
719 United States History Since 1900 3(3,0)
732 Modernization of East Asia 3(3,0)
741 Comparative History of the Americas 3(3,0)
811 Introduction to Historical Research 3(3,0)
814 Modern European Historiography 3(3,0)
821 Studies in Eighteenth Century United States History 3(3,0)
822 Studies in Nineteenth Century United States History 3(3,0)
823 Studies in Twentieth Century United States History 3(3,0)
824 Seminar in the American South 3(3,0)
861 Seminar in Medieval England 3(3,0)
863 Seminar in Tudor England 3(3,0)
864 Seminar in Stuart England 3(3,0)
865 Seminar in Modern England Since 1715 3(3,0)
891 Master's Research. Credit to be arranged.

HORTICULTURE (HORT)
### 201 General Horticulture 3(2.2)F
A working knowledge of the fundamental plant processes is developed, showing the influence of light, temperature, water and nutrients upon vegetative growth and reproduction of horticultural plants. Production practices, harvesting, storage and marketing of the principal fruit, vegetable and ornamental crops are discussed with demonstrations and practice in greenhouse and orchard. *Preq:* BIOL 103, 105 or CH 101.

### 301 Horticulture and Man 2(2.0)
Study of various areas of horticulture as they affect the daily affairs of man. Topics include the horticultural industry, factors influencing plant growth, establishment and maintenance of home grounds, house plants, care of perishable horticultural products, and flower arranging.

### 302 Principles of Vegetable Production 3(2.3)F
The general principles of vegetable growing and handling. Phases receiving special emphasis are economic importance, producing areas, management practices, plant forcing, cultural practices, irrigation, quality factors, harvesting, grading, packing, storage, market inspection, transportation, refrigeration, exhibition and seed production. *Preq:* HORT 201.

### 303 Plant Materials I 3(2.3)F
Woody, ornamental plants and their aesthetic and functional uses in landscape developments. The study covers habit of growth, ultimate size, texture effect, period of bloom, color, and cultural requirements.

### 304 Plant Materials II 3(2.3)S
Herbaceous, ornamental plants which are commonly used as garden flowers. This study covers habit of growth, size, period of bloom, color and cultural requirements.

### 305 Plant Propagation 3(2.3)F

### 308 Landscape Design 3(2.3)S
Landscape planning of residential and public properties in order to achieve best use and most enjoyment from a given piece of ground. *Preq:* HORT 303.

### 310, 610 Floriculture 3(2.3)S
Greenhouse production of commercial flower crops, soils, fertilizers, greenhouse diseases and insects, flower crops to be grown on benches and as pot plants, marketing and costs of production. *Preq:* HORT 201.

### 352 Commercial Pomology 3(2.3)F
Fruit bud formation, rest period and water relations of fruit plants, soils, fruit setting; orchard soil management and responses of various fruits to fertilizers; principles of pruning, effect of climatic differences, freezing of tissues and means of avoiding injury; harvesting, transportation and storage. *Preq:* HORT 201.

### 406, 606 Nursery Technology 3(2.3)S
Principles and techniques in handling nursery crops. *Preq:* HORT 303, 305.

### 407 Landscape Design 3(2.3)F
The first half of this course is a study of trees, shrubs, vines and ground covers used in landscape planting. Attention is given to cultural requirements, growth habits, period of bloom, texture, and fall color. The second half of the course is devoted to landscape planning for small residential properties.

### 409 Seminar 1(1.0)F
Recent research work on various phases of horticulture, methods of conducting investigations, and preparation of report of investigations.

### 410 Seminar 1(1.0)S
Continuation of HORT 409.

### 412, 612 Turfgrass Management 3(2.3)F
Studies of warm and cool season turfgrasses in relation to value, use, regional adaptation, establishment, soils, and cultural practices. The influence of environmental, cultural, and genetic factors on turf quality and serviceability. Identification of grass and weed species and discussion of programs for the management of lawns, parks, roadsides, and golf courses. *Preq:* BIOL 103, 105 or equivalent.
413, 613 Advanced Turfgrass Culture 3(3,0) Studies on the anatomy and morphology of turfgrasses, soil physical properties, soil amendment, and turfgrass nutrition. Discussion of integrated turfgrass pest management programs, soil microbiological activities and the turfgrass ecosystem. Preq: HORT 412 or equivalent.

414 Retail Flower Business 2(2.0) Topics covered include financing, types of business ownership, planning the shop, equipment, refrigeration, lighting, care and handling of flowers, personnel, selling, advertising and promotion, pricing the merchandise, flowers by wire, delivery, etc. A term problem is required. Preq: ECON 211 or equivalent.

416 Floral Design 2(1,3) Topics covered include simple arrangements (history, containers, mechanical aids, etc.), arrangements for specific occasions, church arrangements, funeral designs, bride's bouquets, dried arrangements and flower preservation, corsage preservation, foliage arrangements, bonsai, terrarium, Christmas wreaths, and foliage identification. Preq: ECON 103, 105 or equivalent.

454, 654 Subtropical and Tropical Horticulture 3(3,0) A survey of the horticultural characteristics, culture, harvesting, and handling of subtropical and tropical fruits, vegetables, and ornamental crops of economic significance. The history, importance, adaptation, and world use of these crops will be studied. Preq: AGRIC 104 or BIOL 103, 105 and HORT 201 or 301 or consent of instructor.

455, 655 Small Fruit and Nut Crops 4(3,3)F An in-depth survey of taxonomical, morphological, and physiological characteristics of small fruit and nut crops as they relate to the study of horticultural characteristics, culture, production, harvesting, and handling of both commercial and home-grown grapes, blueberries, strawberries, brambles, pecans, and walnuts. Preq: HORT 305 or consent of instructor.

456, 656 Vegetable Crops 3(3,0) The principles and practices employed in the commercial growing and marketing of vegetable crops. Emphasis is placed on temperature requirements, plant characteristics, varieties, soils, fertilizers, weed control, harvesting and preparation for market.

461, 661 Problems in Landscape Design 3(2,3)F Landscape planning for larger residential properties, schools, industrial plants, real estate developments; detailed finished plans; further study of materials used; original problems; field study. Preq: HORT 308 or 407.

462, 662 Landscape Design Implementation 3(2,3)S Implementation of landscape plans, including interpretation of specifications, bidding, planting methods, construction materials and installation methods, irrigation, lighting, and allied landscape specialties. Also studied—maintenance contracts, equipment, methods, materials and labor management. Preq: HORT 461.

464, 664 Postharvest Horticulture 3(2,2)F The handling of fruits, vegetables, and ornamental crops after harvesting. Subjects include spoilage problems, hydrocooling, common and cold storage of crops, packaging and processing procedures.

470, 670 Hortitherapy 2(2.0) The use of horticultural appeal and methods for improvement of physical and mental well-being will be emphasized. A number of activities will be planned for use in horticultural therapy programs for exceptional individuals in any type of therapeutic situation. Preq: BIOL 103, 105 and consent of instructor.

471, 671 Internship 1-6(0,2-12) Internship under competent supervision in an approved agency dealing with horticultural endeavors. Internships will be designed to provide students with on-the-job horticultural experience. The student will submit monthly reports during the internship and will conduct a departmental seminar at its conclusion. Preq: Junior standing and consent of instructor.

473, 673 Hortitherapy Laboratory 1(0,2) Activities which will be presented will enable students, in turn, to present techniques to exceptional individuals. Emphasis will be placed on performing horticultural skills which are suitable for any therapeutic situation. Preq: For non-Horticulture majors registered in HORT 470.
801 Problems in Small Fruit Production  3(3,0)
802 Research Systems in Horticulture  3(2,3)
803 Experimental Olericulture  3(3,0)
804 Scientific Advances in Ornamental Horticulture  3(3,0)
805 Physiochemical Procedures for Determining Quality in Horticultural Crops  3(2,3)
806 Postharvest Physiology and Handling of Horticultural Crops  3(3,0)
807 Pomology  3(3,0)
808 Special Investigations in Horticulture  2(2,0)
809 Seminar I  1(1,0)
810 Seminar II  1(1,0)
811 Quantitative Exposition of Plant Development  2(1,3)
870 Practicum in Hortitherapy  3(1,4)
891 Master's Research. Credit to be arranged.
991 Doctoral Research. Credit to be arranged.

HOSPITAL AND HEALTH SERVICES ADMINISTRATION (HADM)
Assistant Professor: J. M. McDonald; Lecturers: D. K. Oglesby, Jr., R. E. Toomey; Visiting Instructor: P. L. James

308 Hospital and Health Services Administration  3(3,0) An introduction to the organization and operation of modern American hospitals, separate clinics and public health services. Included will be legal status, organizational peculiarities, and specific legislation affecting such agencies.  Preq: Junior standing.

410, 610 Hospital Internship  3(0,9) The student will spend nine hours per week on a specified program of observing, practicing and experiencing the duties of hospital administrators in selected local hospitals. The course will be specifically outlined along with the amount of time the student will spend in each phase or department of the hospital. Student progress will be constantly monitored by University faculty and hospital staff.  Preq: HADM 308.

800 The Function and Organization of Hospitals and Health Services Administration  3(3,0)

HUMANITIES (HUM)
Associate Professor: J. J. McLaughlin

201 Introduction to the Humanities  3(3,0) A general introduction to humanistic studies, stressing the interrelatedness of various humanistic disciplines. Such fields as art, architecture, music, literature, philosophy, and drama will be considered as they interact with, support, and develop each other in various cultural settings.  Preq: Sophomore standing.

202 Introduction to the Humanities  3(3,0) Continuation of HUM 201.  Preq: Sophomore standing or consent of instructor.

301 Creative Genius in Western Culture  3(3,0) An investigation of creativity through a study of great innovators in art, literature, music, and ideas.  Preq: Junior standing or consent of instructor.

305 Ideas of Progress in Science and the Arts  3(3,0) An investigation of the ideas of progress as they are found in literature, science, the arts, music, and philosophy.  Preq: Sophomore standing.

309 Studies in Humanities  3(3,0) An interdisciplinary approach to the humanities. Specific subject matter varies according to the instructor and as approved by the Dean of Liberal Arts. May be repeated for credit one time.  Preq: Junior standing or consent of instructor.
INDUSTRIAL EDUCATION (INED)

Professors: P. C. Caley, J. P. Crouch, D. E. Maurer, H. E. Morgan, Jr., A. F. Newton, Head; D. H. Pate, Jr., W. E. West; Associate Professors: F. A. Bosdell, B. V. Burkett, Jr.; Assistant Professors: G. G. Lovedahl, B. L. Smith

101 Introduction to Industrial Education 1(1,0) An introduction to the field of industrial education in terms of the underlying philosophies, the aims and goals, and the specific objectives of each of the Industrial Education options. Course activities include research and field experiences in industrial education.

102 Woodworking I 2(1,3) A study of wood, its properties and the requisite skills necessary for understanding the use of wood in our technological way of life.

103 Woodworking II 2(1,3) Continuation of INED 102 in the study of wood, its properties, skills in machine and tool use with wood, project design, project costs and finishing processes necessary for teachers of industrial subjects. Preq: INED 102. 106.


106 Drafting for Industrial Education I 2(0,6) A basic drafting course dealing with sketching, orthographic projection, isometrics, sections, revolutions, developments, intersections, exploded views, working and detail drawings. Lettering and drafting of geometric figures will be studied. Preq: INED 101.

107 Drafting for Industrial Education II 2(0,6) Continuation of INED 106 which deals with drafting in specific fields such as machining, welding, electronics, topography, and architecture. Technical illustration, inking, drafting of jigs and fixtures and assemblies also are studied. A portion of the course is devoted to organizing materials for teaching drafting. Preq: INED 106.

108 Training Programs in Industry I 3(3,0) Introduction and first-hand experience in industrial training programs. Emphasis placed on observing and participating in actual training situations as well as communications and media usage in industry. Preq: INED 101.

203 Basic Metal Processes 3(1,6) Material separating, forming and combining practices in the metals industries through the study of basic casting, welding and sheet metal techniques.

204 Graphic Arts 3(1,6) Major emphasis is placed on the basic principles underlying the graphic arts. Major areas of study include general photography, graphic layout and design, process photography, offset lithography, screen processing, printing, and bindery. Modern industrial applications are stressed throughout.

205 Power Technology 3(2,2) A study of power in terms of energy sources, and the generation, transmission and utilization of power. Emphasis is placed on the development of insights and understandings of the scientific and operational principles involved in the production, transmission, and utilization of power. Preq: INED 101.

206 Advanced Drafting and Design 2(1,3) Study of the relationships of designing and engineering, the design process, stylistic periods, design research, product development, and facility design. Opportunity is provided to gain depth in selected areas such as architectural drawing and technical illustration. Preq: INED 107.

208 Electricity 3(2,3) Theory and application of dc and ac fundamentals, including instrumentality, power sources, circuit analysis, motors, construction wiring, and electronic principles and components. Preq: INED 101.

220 Recreational and Avocational Crafts 3(2,3) Provides exploratory experiences in the performance of a variety of arts and crafts activities, and encourages the development of an understanding of the purpose of arts and crafts in the comprehensive recreational program.

302 Dwelling Materials and Construction Methods 2(1,2) This course is designed as an introduction to the commonly used building materials and the methods of combining them in present day construction. Preq: INED 102.
Industrial Education 249

304 Photographic Techniques 3(1,6) Emphasis is placed on application of black and white photography as activities for vocation and avocation. Sufficient laboratory experiences are provided to assure confidence in the use of photographic techniques. Problems encountered in action, portrait, still life, and character study photography are considered.

310 Methods of Trade Teaching 3(3,0) This course is designed to give basic instruction to beginning teachers in tradework. Psychological factors of learning, individual differences, methods of teaching subjects, the special methods used in teaching skills, grading of students and keeping of proper records and reports. Offered in Summer Sessions only.


313 Arts and Crafts 3(1,6) A study of the art and craft of designing and making well-designed, useful objects. Emphasis on the development of skill and knowledge in the industrial crafts. Included will be laboratory activity involving work with wood, metal, ceramic, textiles, paper, and leather materials. Preq: INED101.

316 Plastics and Plastic Processes in the General Shop 3(3,0) The industrial, commercial and personal uses of plastics are discussed and demonstrated. In addition, the kinds of plastics, their properties, and special uses are studied. Offered in Summer Sessions only.

317 Management of Industrial Education Laboratories 3(2,2) Management and operation of unit and multiple-activity laboratories, including laboratory design, selection and procurement of tools and equipment, budgeting management, and coordination of activities in laboratory courses.

320 Machine Woodworking 2(1,3) Basic characteristics of woodcutting, shaping, and finishing operations by use of machinery and auxiliary tools. Includes project work. Preq: Junior standing.

325 Industrial Organizations and People 3(3,0) A study of the relationship of training and safety personnel to the kinds of tasks they are asked to perform in industrial situations. Emphasis is on safety knowledge development and on techniques which may be used in industrial safety training. Preq: INED 101 or consent of instructor.

350 Industrial Cooperative Experience 6(0,18) A full-time work experience program in industry. The course is offered during the summer only. Students are requested to register with the instructor one semester prior to the summer in which they plan to enroll. Preq: Junior standing in the Vocational–Technical Education program; consent of instructor.

372 Arts and Crafts for the Elementary Child 3(2,3) Provides the elementary school teacher with an opportunity to develop skills and knowledge in the use of a variety of media suitable for integrating the study of industry and industrial technology into the usual classroom procedures.

402 Directed Teaching 6(0,18) Supervised observation and teaching in cooperation with selected public schools in which opportunities are provided for securing experience in teaching industrial subjects. Preq: INED 317, 425. and grade-point ratio required for graduation.

405, 605 Course Organization and Evaluation 3(3,0) Problems, techniques and procedures in the preparation, selection and organization of subject matter for instructional purposes. Methods, techniques and preparation of materials used in the evaluation of student achievement in industrial education subjects.

408, 608 Training Programs in Industry II 3(3,0) Basic concepts of supervision, administration, and management of training programs. Emphasis on determining training requirements, planning, directing, and evaluation training programs. Preq: INED 405.

410, 610 Special Institute Course: Topics in Industrial Education 1-3(1-3,0) Subject areas organized according to institute needs. Content of the course will be planned cooperatively.
by the University and the school system or agency requesting the course. Preq: Teacher or Graduate standing.

414, 614  Electronics for Teachers  3(1,6)  Principles of electronics as applied in communications and automatic controls involving transistors, integrated circuits, and other electronic devices and materials for the preparation of teachers of industrial arts and vocational-technical electricity and electronics. Preq: INED 208 or equivalent.

415, 615  Construction Practices  3(2,3)  A study of industrial practices affecting man, materials, and equipment employed by the construction industry. Activities are directed to developing a working knowledge of construction technology and a framework for incorporating this industry into the industrial arts curriculum of the secondary school. Preq: INED 101 or Graduate standing.

418, 618  Technological Concepts in Manufacturing  3(2,3)  This course is designed to familiarize industrial arts students with the technological concepts of management, production, and personnel practices employed in manufacturing industries. Students also will develop materials and utilize methods which will assist them in teaching concepts about manufacturing at the secondary-school level. Preq: INED 101 or Graduate standing.

421  Vocational Cooperative Programs  3(3,0)  A study of the developments, objectives and principles of cooperative training programs. Emphasis is on the organization, promotion, and management of programs in vocational education. Preq: Consent of instructor.

422, 622  History and Philosophy of Industrial and Vocational Education  3(3,0)  A study of industrial and vocational education programs with the intent of developing a sound individual philosophy of industrial and vocational education. General topics covered: history; local, state, and federal legislation; types of vocational-technical programs; professional organizations; manpower utilization, vocational guidance, and training; industry, labor, and school relationships.

424, 624  School Safety  3(3,0)  Study of the principles of school safety emphasizing safety analyses, accident prevention, remediation of unsafe conditions, development and use of instructional materials, and school liability. Preq: Senior or Graduate standing in Education.

425, 625  Teaching Industrial Subjects  3(3,0)  Effective methods and techniques of teaching industrial subjects. Emphasis is given to class organization, preparation of lesson outlines, and audio-visual aids. Preq: ED 335.


435, 635  Advanced Industrial Metalworking Practices  3(2,3)  Continuation of INED 203, enabling advanced studies in welding, foundry, and structural metals. A portion of the course will be devoted to studying existing metals manufacturing industries and to developing and using curriculum materials for teaching metalworking concepts. Field trips will be taken. Preq: INED 203.

438, 638  Advanced Machining  3(1,6)  Advanced experiences in the set-up, operation and maintenance of machine tools and equipment. Project and product design. Study and reports of recent machining technological developments. Preq: INED 105.

440, 640  Advanced Techniques of the Graphic Arts  4(2,4)  Students selecting to pursue the area of graphic arts will gain experience in the development of advanced techniques of layout and design; photographic copy preparation; cold type composition; line, halftone, duotone, and special-effects photography, full color reproduction and advanced platemaking; process stripping, and color offset presswork. Preq: INED 204.

441  Comprehensive Laboratory in Industrial Education  3(1,4)  Course designed to develop skill in working in and the management of multiple activity program as carried out in the industrial arts and prevocational laboratories. Opportunity is provided to develop a management
plan for multiple activities in comprehensive laboratories that the student can use during the directed teaching experience. *Preq:* INED 101 and a minimum of 4 courses selected from the following: INED 102, 105, 203, 204, 205, 208.

442 **Competency Testing in Vocational Subjects** 3(3,0) This course is especially designed for trade teachers who have assisted in making trade tests for S. C. Certification program. Teachers who expect to assist in making trade tests are also urged to enroll in this course. The course is devoted to revising present trade tests and developing tests in new fields. Offered in Summer Sessions only.

444, 644 **Graphic Arts Production Control** 3(2,3) A study of commercial and industrial printing control. Emphasis is placed upon consideration for decision making in the areas of process and equipment selection and plant layout. Other topics include production flow, cost analysis, and recent developments as they affect production. *Preq:* INED 204, 440, or consent of instructor.

450 **Industrial Cooperative Experience** 6(0,18) Continuation of INED 350. Summer only. *Preq:* Senior standing, INED 350, and consent of instructor.

451 **Special Projects** 3(3,0) The student is assigned a project in accordance with his needs and capabilities. Projects are either experimental, theoretical or developmental and cover subjects not thoroughly covered in other courses. *Preq:* Consent of Instructor.

452, 652 **Advanced Projects** 1-6 The student gains depth in content by completing a project under the supervision of an instructor in one of the following subject areas: (a) Arts and Crafts, (b) Drawing and Design, (c) Electricity and Electronics, (d) Graphic Arts, (e) Metalworking, (f) Occupational Education, (g) Power, and (h) Woodworking. *Preq:* Consent of instructor.

460, 660 **Career Education** 3(3,0) An introduction to the concepts and philosophical basis for career education with emphasis on the applications of career education as an integrating force within the total school curriculum. This course is designed for all students preparing to teach or those seeking to improve their teaching competencies. *Preq:* AGED 201, ED 100, INED 101, or Graduate standing.

464, 664 **Still Picture Production** 3(1,4) This course includes media selection, specification of learning outcomes, program planning, storyboard, art creation and direction, photography, scripting, and audio tape production and synchronization. *Preq:* INED 304 or consent of instructor.

465, 665 **Motion Picture Production** 3(1,4) A study of how to produce video tape and motion picture presentations. *Preq:* INED 464 or consent of instructor.

496, 696 **Public Relations** 3(3,0) This course emphasizes the techniques and methods of effective public and industrial relations which contribute to understanding and cooperation of labor, business, professional, educational, and industrial groups.

815 **Seminar in Industrial Education** 1(1,0)

820 **Recent Process Developments** 3(3,0)

840 **School Shop Design** 3(3,0)

845 **Curriculum Planning and Development in Industrial Education** 3(3,0)

860 **Curriculum Materials Development in Industrial Education** 3(3,0)

861 **Administration and Supervision of Vocational Education** 3(3,0)

865 **American Industries** 3(3,0)

894 **Project Research** 1-6(1-6,0)

895 **Special Problems I** 3(3,0)

896 **Special Problems II** 3(3,0)
INDUSTRIAL ENGINEERING (IE)

Professor: J. A. Chisman; Associate Professors: C. R. Lindenmeyer, T. H. Oswald


306 Advanced Manufacturing Processes 3(2,3) Exploration of modern material removal and shaping processes. Special laboratory investigations. Preq: Consent of instructor.

INDUSTRIAL MANAGEMENT (IM)


200 Introduction to Business 3(3,0) The role of business in our society will be critically examined. The student will be exposed to a broad overview of the functions of a business. Enrollment for credit not allowed for students majoring in Accounting, Administrative Management, Financial Management, or Industrial Management.

299 Computer Utilization I 1(0,3) Familiarization in the use of modern timesharing computer terminals and minicomputers. Preq: CPSC 120 or equivalent.

301 Principles of Management 3(3,0) Management's role as a factor of economic production. Functions of management, principles of organization, and behavior in organizations.

304 Statistical Quality Control 3(3,0) Basic statistical control techniques in all areas of industry. Sampling, statistical control, and inspection problems are studied with special reference to practical applications. Emphasis is placed on the underlying statistical theory and the assumptions associated with the various procedures. Preq: MTHSC 203 or 301.

307 Personnel Management 3(3,0) Principles, concepts, and techniques concerned with effective and efficient utilization of personnel. Emphasis on motivation, leadership, and human behavior as they relate to employer-employee relations. Topics include personnel recruitment, classification, selection, training, development, and performance evaluation. Preq: Junior standing.

308 Principles of Marketing 3(3,0) Principles and concepts involved in planning, pricing, promotion, and distribution of goods and services.

400 Management of Organizational Behavior 3(3,0) The purpose of this course is to provide the management student with a framework for understanding how behavior within business organizations is managed. Particular emphasis will be placed on integrating management theory with recent developments in the behavioral sciences with distinct management applications. Theory, research, and business applications will be considered. Preq: IM 301 or 307, or consent of instructor.

401, 601 Quantitative Marketing Analysis 3(3,0) Quantitative techniques applied to the investigation and solution of marketing problems. Emphasis is placed on the use of decision theory, game theory, Markov chain models, sales forecasting models, sample survey design, mathematical programming, simulation models, and marketing information systems. Preq: IM 308, MTHSC 203 or 301.

402, 602 Operations Planning and Control 3(3,0) Concepts and models important to management are stressed in this course. Emphasis is placed on elementary deterministic and
stochastic inventory models, inventory analysis and control systems, forecasting techniques, operations, introduction to simulation, network programs, and production planning and scheduling. *Preq:* MTHSC 203 or 301 and Senior standing.

403 **Special Problems 1-3(1-3,0)** Planning, developing, and executing a research project related to the field of management or defense studies. *Preq:* Senior standing in Industrial Management or Administrative Management.

404, 604 **Managerial Economics 3(3,0)** Use of tools of economic analysis in classifying problems, in organizing and evaluating information, and in comparing alternative courses of action. Bridges the gap between economic theory and managerial practices. *Preq:* MASC 310 or 311, or consent of instructor.

405, 605 **Economics of Transportation 3(3,0)** Topics covered include history and structure of transportation systems in the United States, the nature of transportation costs and rates, transportation systems as factors in industrial location, government policy toward transportation, and transportation and national security. *Preq:* Senior standing and consent of instructor.

406, 606 **Theory of Industrial Location 3(3,0)** A theoretical study of the general factors which determine industrial location in a market place economy. Current literature is surveyed. A comparison of location theory and actual location patterns is stressed. *Preq:* Senior standing and consent of instructor.

407 **Directed Research 1(1,0)** Planning, developing, and executing a research project related to the field of management. *Preq:* Senior standing in Administrative Management or Industrial Management.

408, 608 **Work Simplification and Standardization 3(3,0)** Principles and practices of motion and time as it is applied to industry. Emphasis is given to its application and its influence on methods, material handling, plant layout, and time study procedures.

410 **Directed Research in Marketing 1(1,0)** Directed independent research and analysis of contemporary topics in marketing. *Preq:* IM 308.

412, 612 **Marketing Management 3(3,0)** Application of marketing principles in the investigation and solution of marketing problems. Managerial decision areas include products development, pricing, advertising, personal selling, and channels of distribution. *Preq:* IM 308, MASC 310.

413, 613 **Marketing Communications 3(3,0)** An analysis of mass and interpersonal communications in marketing. Attention is given to communications theory, advertising, sales promotion, and personal selling. *Preq:* IM 308.

415, 615 **Business Policy 3(3,0)** This is a capstone course for seniors. The case method is used in solving complex business problems requiring the student to integrate his knowledge of the functional areas of business. Student participation and written and oral communication are stressed. *Preq:* IM 301 or 307 and Senior standing.

416, 616 **Management of Human Resources 3(3,0)** Recent developments in the management of human resources with emphasis on results of research into the motivation, development of potential, and full utilization of the human resources. *Preq:* IM 307 or consent of instructor.

417, 617 **Logistics Management 3(3,0)** Management of physical distribution and supply systems with emphasis on design concepts, cost determinants and control. *Preq:* Senior standing.

418, 618 **Management Information Systems 3(3,0)** The use of data processing concepts as an aid in implementing managerial functions. Electronic data processing terminology, software, hardware, computer operations and techniques, systems analysis, and the principles of management information systems design and implementation are emphasized. *Preq:* CPSC 120 or equivalent. *Coreq:* IM 499.
419, 619 **Marketing Information 3(3,0)** The planning, collection, processing, and utilization of information used in marketing decision making. *Preq:* IM 308, MTHSC 301.


421, 621 **Consumer Behavior 3(3,0)** An examination of selected behavioral science concepts and their application to the understanding of consumer decision making. Text and cases. *Preq:* IM 308.

422 **Small Business Management 3(3,0)** The study of the management of the small independently owned and operated business. Emphasis will be placed upon analyzing new business opportunities, planning and establishing a going concern, and managing the contemporary small business. Field experience in consulting with small businesses will enhance the student's understanding of the unique opportunities and problems of small business organizations. *Preq:* ACCT 201, IM 301, 308.

499 **Computer Utilization II 1(1,0)** Components of computer systems and effective methods of selection and utilization. Topics include review of terminology, methods of communicating with computer personnel, languages, package programs, package systems, and sources of current literature. *Preq:* CPSC 120 or equivalent.

**ITALIAN (ITAL)**

*Assistant Professors:* L. T. Perry, J. B. Romeiser

101, H101 **Elementary Italian 4(3,1)** An introductory course stressing grammar, pronunciation, oral practice, and reading skills. Attention is given to practical everyday living as well as cultural considerations.

102, H102 **Elementary Italian 4(3,1)** Continuation of ITAL 101. *Preq:* ITAL 101 or consent of instructor.

201, H201 **Intermediate Italian 3(3,0)** A brief review of ITAL 101 and 102, with conversation, composition, and dictation; and the beginning of more serious reading of Italian prose in short stories and plays. *Preq:* ITAL 102.

202, H202 **Intermediate Italian 3(3,0)** Increasingly difficult readings in Italian literature, supplemented with classroom discussions and compositions. *Preq:* ITAL 201.

**LATIN (LAT)**

*Associate Professor:* R. R. McGregor, Jr.

101 **Elementary Latin 3(3,0)** A course for beginners designed principally to teach the reading of the language.

102 **Elementary Latin 3(3,0)** Continuation of LAT 101 with the introduction of supplementary readings from Classical and Medieval authors.

201 **Intermediate Latin 3(3,0)** A review of the fundamental principles of grammar in conjunction with readings from the Classical period. *Preq:* LAT 102 or equivalent.

202 **Intermediate Latin 3(3,0)** Continuation of LAT 201 with the introduction of writings from the late Latin and Medieval periods. *Preq:* LAT 201 or equivalent.
LAW (LAW)

Associate Professor: S. H. Brown; Assistant Professors: C. T. Deal, E. C. Hipp, Jr., M. H. Sanders; Lecturer: T. M. Patrick, Jr.

312 Commercial Law 3(3.0) An introduction to business law with primary attention given to contracts, agency, negotiable instruments, and sales. Preq: Junior standing.

313 Commercial Law 3(3.0) Continuation of LAW 312 with emphasis on business organization, personal and real property, estates and bankruptcy, and security services. Preq: LAW 312 or consent of instructor.

322 Legal Environment of Business 3(3.0) The development of both state and national regulation of business. Attention is given to the constitutional force and limitations of power, specific areas in which governments have acted, and the regulations that have been imposed in these areas. Preq: Junior standing.

401 Labor Law 3(3.0) Basic labor law in the National Labor Relations Act, the Taft-Hartley and Landrum-Griffin Acts. Legal problems raised by state and federal statutes such as workmen’s compensation, unemployment compensation, wage and hour legislation, and equal opportunity laws. Preq: LAW 322, Junior standing.

LEISURE SKILLS (LS)

130 Alpine Skiing 1(0.45) Basic downhill snow skiing instruction including equipment selection, safety, and maintenance; parallel turns; edging; carved and linked turns; wedeling; and safety and etiquette. There is an additional fee for this course. Taught during Christmas recess. (Contact the Department of Recreation and Park Administration in October.)

140 Fencing 1(0.3) Individual and group instruction for beginners in the basic skills and techniques of foil fencing.

150 Beginning Swimming 1(0.3) Fundamentals of swimming and water safety.

151 Aquatic Sports and Diving 1(0.3) This course is designed to acquaint the student with various forms of aquatic sports: competitive swimming, diving, and water polo.

152 Sailing 1(0.3) Basic instruction in the nomenclature, safety and rescue techniques, and skills required to skipper sailing craft. Preq: Basic swimming skills.

153 Beginning Canoeing 1(0.3) Basic instruction in the nomenclature, strokes, and safety techniques in canoeing. Preq: Basic swimming skills.

160 Beginning Tennis 1(0.3) A fundamentals course stressing rules, basic strokes and strategy, with ample opportunity for practice.

162 Handball 1(0.3) A thorough knowledge and understanding of the rules, strategy, fundamental skills, and techniques of handball for the beginning player.

163 Racquetball 1(0.3) The basic skills, knowledge of rules, and strategy of racquetball.

170 Beginning Golf 1(0.3) A fundamentals course stressing rules, strategy, and basic strokes.

190 Modern Dance 1(0.3) An introduction to modern dance techniques with emphasis on developing the style of movement and understanding the dance art form.

252 Advanced Sailing 1(0.3) A course in the fundamentals of sailboat racing. Preq: LS 152 or consent of instructor.

254 Advanced Lifesaving 1(0.3) Course designed to enhance aquatic skills and to develop lifesaving techniques. It teaches progressive techniques and practice of lifesaving and water safety skills. Preq: Pass preliminary swim test.

255 Water Safety Instruction 0.3) Course teaches progressive techniques and practice of teaching swimming and lifesaving. Preq: LS 254.
260 Intermediate-Advanced Tennis 1(0,3) The opportunity to advance and correct mistakes in basic tennis skills. Preq: Basic tennis skills.

263 Intermediate Racquetball 1(0,3) A course stressing advanced skills, techniques, and strategy with ample opportunity for practice and competition. Conditioning drills and safety aspects will also be covered. Preq: LS 163 or consent of instructor.

MANAGEMENT (MGT)

800 Management Gaming 1(0,3)
801 Quantitative Economic Analysis 3(3,0)
802 Finance 3(3,0)
803 Operations Management 3(3,0)
804 Managerial Policy 3(3,0)
805 Advanced Quality Control 3(3,0)
807 Comparative Management Theory 3(3,0)
810 Management and the Law 3(3,0)
811 Advanced Marketing Analysis 3(3,0)
812 Transportation Planning and Policy 3(3,0)
816 Management of Human Resources 3(3,0)
891 Master’s Research. Credit to be arranged.

MANAGEMENT SCIENCE (MASC)


310 Introduction to Management Science 3(3,0) Quantitative methods of the management scientist with applications to economic, business, and industrial problems. Topics include regression analysis, analysis of variance, sampling, and decision making under uncertainty, nonparametric methods, elementary queuing modules, and linear programming. Preq: ECON 211, MTHSC 301.

311, 611 Introduction to Econometrics 3(3,0) Elements of time series analysis and an introduction to the measurement, specification, estimation, and interpretation of functional relationships through single equation least squares techniques. Problems of multicollinearity, dummy variables, heteroscedasticity, autocorrelation, and lagged variables in simple economic models are introduced. Preq: ECON 314, MTHSC 301.

413, 613 Management Science I 3(3,0) The role and use of management science techniques in decision making in business and industry. Static and deterministic models will be emphasized. Topics include linear programming, queuing, Markov chains, and simulation. Preq: Consent of instructor.

414, 614 Statistical Analysis 3(3,0) Application of statistics in management decision making. Emphasis is placed on the proper design, analysis, and interpretation of planned experiments. Topics include single factor through fractional factorial experiments. Preq: MTHSC 301 or equivalent.

806 Regional Science Methods 3(3,0)
807 Econometric Methods I 3(3,0)
808 Econometric Methods II 3(3,0)
812 Management Science II 3(3,0)
MATERIALS ENGINEERING (MATE)


304 Metallographic Analysis 3(1,6) Laboratory exercises will acquaint the student with typical industrial and research metallographic techniques involving specimen preparation and scientific photography. Standard and specialized laboratory equipment will be introduced and used with emphasis on relating metallographic observations to material properties.

405, 605 Physical Metallurgy 3(3,0) A comprehensive treatment of electron theory, lattice defects, diffusion, solutions and phase equilibria, phase transformations, creep and fracture applied to metals and simple alloys, with emphasis on structure-property relationships. Preq: CRE 310.

420, 620 Introduction to Mechanical Metallurgy 3(3,0) Introduction to the elastic and plastic response of metals to pressure. Topics include the mechanisms and consequences involving ductility, brittleness, crystallography, fatigue, and creep. Preq: CRE 310 or equivalent.

422, 622 Introduction to Chemical Metallurgy 3(3,0) Application of structural and physical chemistry concepts to metallurgical systems. Emphasis is placed upon problem solving by both numerical and graphical methods. Major topics include bonding, intermetallic compounds, solid solutions, and heterogeneous equilibria. Preq: CRE 310 or equivalent. Coreq: CH 331.

424, 624 Introduction to Extractive Metallurgy 3(3,0) Introduction to the economics, techniques, and theory of extracting metals from their ores. Emphasis is placed upon the chemistry and mechanics of extraction through problems involving efficiencies and yields of various metallurgical processes. Preq: CRE 310 or equivalent. Coreq: CH 331.

450, 650 Special Topics in Materials Engineering 1-4(0-4,12-0) A comprehensive study of a topic of current interest in the field of materials engineering. May be taken for credit more than one time. Preq: Consent of instructor.

461, 661 Elements of Metallurgy 3(2,3) A survey of industrial metallurgical processes including extraction of metals from their ores, primary fabrication of metals, heat and surface treatments, methods of secondary fabrication, and the mechanical testing of metals. Laboratory sessions emphasize the measurement of properties of metals and alloys as they are influenced by process variables. Preq: CRE 310 or equivalent.

462, 662 Heat Treatment of Steels 3(2,3) Industrial processing of commercially important ferrous material including plain carbon and low alloy steels; precipitation hardenable steels; tool steels and cast irons with special emphasis on response to heat treatment: annealing, hardening, alloying, and atmosphere control. Laboratory determination of bulk and surface effects of treatment on mechanical properties. Preq: CRE 310 or equivalent.

463, 663 Metallurgy of Welding and Nondestructive Testing 3(2,3) Survey of welding processes, including resistance, forge, gas, arc, thermite, ultrasonic, electron beam and laser welding with reference to metallurgical effects and materials applicability. Includes nondestructive test methods for industrial weld inspection. Laboratory determination of microstructural and stress effects induced by welding and effects on material serviceability. Preq: CRE 310 or equivalent.

464, 664 Industrial Corrosion of Metals 3(2,3) Introduction to technical aspects of corrosion as it affects various industrial operations. Classification of types of metallic corrosion. Techniques of industrial corrosion protection with emphasis on materials selection and case histories. Industrial corrosion testing techniques and relation of metallic corrosion to basic electrochemical concepts. Preq: CRE 310 or equivalent.
Introduction to Plastics 3(3,0) Basic polymer chemistry, structure, properties, and testing; manufacture and application of industrial plastics and elastomers. Crystalline-amorphous systems, fibers, addition and condensation polymers, block- and graft-copolymers, thermoplastics, thermostes, elastomers, catalysis, curing, plasticizers, stabilizers, fire retarders, and pigments. Preq: CH 201, CRE 310 or equivalent.

Seminar in Materials Research 1(1,0)

Deformation Mechanisms in Solids 3(3,0)

Chemical Metallurgy 3(3,0)

Extractive Metallurgy 3(3,0)

Master's Research. Credit to be arranged.

MATHEMATICAL SCIENCES (MTHSC)


Preparatory Mathematics 2(5,0) Topics to be covered: Sets and real numbers; algebra of polynomials and fractions; first-degree equations and inequalities in one variable; exponents, radicals, and complex numbers; quadratic equations and inequalities; logarithms; functions. Preq: Required of freshmen requiring MTHSC 101/102 that fail to make a satisfactory score on the Mathematics Test, Level II (Standard). No curriculum in the College of Sciences will allow credit for MTHSC 100 to be used to satisfy the requirements for graduation.

Finite Probability 3(3,0) Topics include probability, discrete random variables, and probability distribution. Preq: A satisfactory score on the Mathematics Test, Level II (Standard) or consent of instructor.

Introduction to Mathematical Analysis 3(3,0) An intuitive approach to the concepts and applications of calculus. Topics include functions and graphing, differentiation, and integration. Applications include functions and graphing, differentiation, and integration. Not open to those receiving credit for MTHSC 106. Preq: A satisfactory score on the Mathematics Test, Level II (Standard) or consent of instructor.

Trigonometry 2(2,0) Topics to be covered are circular functions, graphs of circular functions and their inverses, identities and conditional equations, trigonometric functions and complex numbers.

Algebra and Trigonometry 5(5,0) Freshman mathematics. A unified course in algebra and trigonometry. Properties of real numbers, algebraic expressions, equations and inequalities in one variable, relations and functions, polynomial and rational functions, exponential and logarithmic functions, circular functions, trigonometric functions and conditional equations, matrices and determinants, and complex numbers.

Calculus of One Variable 4(4,0) Topics include analytic geometry, introduction to derivatives, computation and application of derivatives, integrals, exponential and logarithm functions. Preq: MTHSC 105, or a satisfactory score on the Mathematics Test, Level II (Standard) or consent of instructor.

115  Contemporary Mathematics for Elementary School Teachers I  3(3,0)  Logic, sets, and the properties of the counting numbers, numeration systems. Open only to Elementary Education majors. *Preq:* Consent of instructor.

116  Contemporary Mathematics for Elementary School Teachers II  3(3,0)  Continuation of MTHSC 115. Subtraction, properties of the integers, elementary number theory, rational number system, real number system. Open only to Elementary Education majors. *Preq:* MTHSC 115 or consent of instructor.


206, H206  Calculus of Several Variables  4(4,0)  Topics include real valued functions of several variables, multiple integration, differential calculus of functions of several variables, vector field theory. *Preq:* MTHSC 108.

207  Multivariable Calculus  3(3,0)  Introduction to the calculus of several variables. Topics include functions of several variables, differential calculus and optimization of several variables, multiple integrals and an introduction to difference equations. Topics from the management sciences will be used to illustrate the above concepts. *Preq:* MTHSC 102 or 106 with consent of instructor.

208, H208  Engineering Mathematics I  4(4,0)  This course presents an introduction to the study of differential equations and their application to physical problems. The topics include exact solutions, series solutions, numerical solutions, solutions by means of Laplace transforms, and solutions of systems of differential equations. *Preq:* MTHSC 206.

210  Applied Matrix Algebra  3(3,0)  Introduction to the basic principles of matrix algebra with applications to the behavioral and managerial sciences. The major areas of application will include linear programming, directed graphs, and game theory. *Preq:* MTHSC 101 and 102 or 106.

215  Algebra for Elementary School Teachers  3(3,0)  Linear equations and linear inequalities in one variable, functions and graphs, systems of linear equations and linear inequalities, quadratic equations, complex number system. Finite number systems, algebraic structures. Open only to Elementary Education majors. *Preq:* MTHSC 216.

216  Geometry for Elementary School Teachers  3(3,0)  An informal treatment of the basic concepts of geometry. Open only to Elementary Education majors. *Preq:* MTHSC 116 or consent of instructor.

231  Mathematics of Life Insurance  3(3,0)  Introduction to the basic mathematics of finance and life insurance. Topics include compound interest, annuities certain, mortality tables, life annuities, net premiums, net level reserves, modified reserves, nonforfeiture values and dividends.

232  Actuarial Science Seminar I  1(1,0)  A problem-solving seminar designed to prepare the student for the Society of Actuaries Examination I (General Mathematics). *Preq:* MTHSC 206.

301, H301, 601  Statistical Theory and Methods I  3(3,0)  Principal topics include elementary probability theory, discrete and continuous random variables, expected values, normal
distribution, chi-square distribution, t-distribution, F-distribution, test of hypothesis, point and interval estimation, curve fitting. *Preq:* MTHSC 106 or 207 or 210.

**308 College Geometry 3(3,0)** Theorems and concepts more advanced than those of high school geometry. A treatment of the various properties of the triangle, including the notable points, lines, and circles associated with it. *Preq:* MTHSC 106.


**350 Introduction to Mathematical Models 3(3,0)** A study of the modeling process which will include the translation of practical problems into mathematical models, the solution of the mathematical models, and the interpretation of the solution back into practical problems. Examples will be chosen from the physical, biological, social, and management sciences. *Preq:* CPSC 110, MTHSC 208, 301.

**360 Intermediate Mathematical Computing 3(3,0)** Continuing study of mathematical computing using the FORTRAN language. Emphasis on subroutine computation with applications to problems in science and engineering. *Preq:* CPSC 110 or consent of instructor.

**402, H402, 602 Theory of Probability 3(3,0)** Principal topics include combinatorial theory, probability axioms, random variables, expected values; special discrete and continuous distributions; jointly distributed random variables; correlation, conditional expectation, law of large numbers, central limit theorem. *Preq:* MTHSC 206, 301, or consent of instructor.

**403, H403, 603 Statistical Inference 3(3,0)** Principal topics include sampling distributions, point and interval estimation, maximum likelihood estimators, method of moments, least squares estimators, tests of hypothesis, likelihood ratio methods, regression and correlation analysis, introduction to analysis of variance. *Preq:* MTHSC 206, 301.

**404, 604 Introduction to Stochastic Processes 3(3,0)** Principal topics include random variables, Markov processes, limiting distributions. Examples from scientific fields will be used in the construction of stochastic models of physical and behavioral phenomena. Applications to such topics as queuing, inventory, reliability, and decision analysis will be treated. *Preq:* MTHSC 402.

**405, 605 Statistical Theory and Methods II 3(3,0)** Principal topics include simple linear regression, multiple regression and correlation analysis, one-way analysis of variance, multiple comparison, multifactor analysis of variance, experimental design. Computation and interpretation of results are facilitated through use of statistical computer packages. *Preq:* MTHSC 301.


**408, 608 Topics in Geometry 3(3,0)** Introduction to topics in special geometries which include non-Euclidean space concepts, such as projective geometry, finite geometries, and intuitive elementary topology. A brief introduction to vector geometry. *Preq:* MTHSC 206.

**409, 609 Statistical Theory and Methods III 3(3,0)** Principal topics include the analysis of enumerative data, nonparametric methods, sampling techniques, and time-series analysis. *Preq:* MTHSC 405 or consent of instructor.

**411, H411, 611 Linear Algebra 3(3,0)** Introduction to the algebra of matrices, vector spaces, polynomials and linear transformations. *Preq:* MTHSC 206 or consent of instructor.

**412, H412, 612 Introduction to Modern Algebra 3(3,0)** Introduction to the concepts of algebra. Topics included are the number system and the elementary theory of groups, rings, and fields. *Preq:* MTHSC 411.
415, H415 Introduction to Topology  3(3,0)  An introduction to point set topology; Hausdorff, regular and normal spaces; metric, connected and compact spaces; continuous mappings and homeomorphisms. Preq: MTHSC 206.

419, H419, 619 Discrete Mathematical Structures I  3(3,0)  This course applies theoretical concepts of sets, functions, binary relations, graphs, Boolean algebras, propositional logic, semigroups, groups, homomorphisms, and permutation groups to computer characterization and design, words over a finite alphabet and concatenation, binary group codes, and other communication or computer problems. Preq: MTHSC 411.

420, 620 Discrete Mathematical Structures II  3(3,0)  This course applies graph theory, ring and field theory, cardinality of sets, and difference equations to Nim games and other perfect information games, transport networks, shortest route problems, polynomial codes, Bose-Chan
dhuri-Hoquenghem codes, machine computability, mathematical linguistics, and different codes. Preq: 412, 419, or consent of instructor.


430, 630 Actuarial Finite Differences  3(3,0)  Topics include finite differences, factorial polynomials, Stirling's numbers, summation, Newton's interpolation formula, operators, collocation polynomials, Lagrange's interpolation formula, divided differences, numerical (including Gaussian) integration, singular integrals, and numerical solution of linear equations. Preq: MTHSC 206 or consent of instructor.

431, 631 Theory of Interest  3(3,0)  A comprehensive treatment of the theory of interest from a continuous viewpoint. Topics include simple and compound interest, annuities certain, amortization schedules and sinking funds, and application of the theory to bonds and other securities. Preq: MTHSC 430 or consent of instructor.

432 Actuarial Science Seminar II  1(1,0)  A problem-solving seminar designed to prepare the student for the Society of Actuaries Examination 2 (probability and statistics). Preq: MTHSC 403 may be taken concurrently or consent of instructor.


452, H452, 652 Linear Programming  3(3,0)  An introduction to linear programming, using elementary matrix algebra and the theory of convex polygons. Applications to managerial problems, operations research, economic behavior, the theory of games and military strategy are considered. Preq: MTHSC 206 or consent of instructor.

453, H453, 653 Advanced Calculus I  3(3,0)  Limits, continuity, and differentiation of functions of one and several variables, the Riemann integral, and vector analysis. Preq: MTHSC 206.

454, H454, 654 Advanced Calculus II  3(3,0)  Continuation of MTHSC 453. Transformations, multiple integrals, line and surface integrals, infinite sequences and series, and improper integrals.

457, 657 Applied Mathematics I  3(3,0)  Determinants and matrices, review of differential equations, finite differences, Fourier series and integrals, Laplace transformations, a large selection of applications. Preq: MTHSC 208.


460, 660 Introduction to Numerical Analysis I  3(3,0)  Introduction to the problems of numerical analysis emphasizing computational procedures and application. Topics include

461, 661 \textbf{Introduction to Numerical Analysis II} 3(3,0) Continuation of MTHSC 460. Ordinary differential equations, boundary value problems, functional approximation, numerical solution of partial differential equations, and Monte Carlo techniques. \textit{Preq:} MTHSC 460 or consent of instructor.  

463, H463, 663 \textbf{Mathematical Analysis I} 3(3,0) Basic properties of the real number system, sequences and limits; continuous functions, uniform continuity and convergence. Integration, differentiation, functions of several real variables, implicit function theory. \textit{Preq:} MTHSC 206.  

464, H464, 664 \textbf{Mathematical Analysis II} 3(3,0) Continuation of MTHSC 463.  

471, 671 \textbf{Applied Statistical Decision Theory} 3(3,0) An introduction to statistical decision theory emphasizing the Bayesian approach. Behavioral axioms, characterizing the "Rational decision maker," lead to the laws of probability theory and utility theory. Topics include axioms of subjective probability and utility, extensive and normal form analysis, likelihood principle, conjugate distributions. \textit{Preq:} MTHSC 402.  

473, 673 \textbf{Introduction to Nonlinear Optimization} 3(3,0) An introduction to the application and theory of nonlinear optimization problems. The primary topics include classical optimization based on the calculus, approximation techniques, separable programming, quadratic programming, gradient methods, and dynamic programming. \textit{Preq:} MTHSC 452, 453.  

481 \textbf{Seminar in Mathematics} 1-3(1-3,0) Attention will be focused upon mathematical areas in which nonroutine problems can be posed with comparative ease. Emphasis will be upon independent study and student use of previously acquired mathematical skills. Open to students only by invitation for not more than three hours credit.  

701 \textbf{Number Systems for the Elementary Grades} 3(3,0)  
702 \textbf{Number Systems for the Middle Grades} 3(3,0)  
703 \textbf{Modern Mathematics for Elementary School Teachers — Geometry} 3(3,0)  
705 \textbf{Modern Mathematics for Elementary School Teachers — Algebra, Probability and Statistics} 3(3,0)  
710 \textbf{Elementary Calculus from an Advanced Viewpoint} 3(3,0)  
712 \textbf{Modern Algebraic Concepts} 3(3,0)  
721 \textbf{Matrix Algebra I} 3(3,0)  
722 \textbf{Matrix Algebra II} 3(3,0)  
725 \textbf{Combinatorial Mathematics for Teachers} 3(3,0)  
730 \textbf{Modern Geometry for Teachers} 3(3,0)  
731 \textbf{Non-Euclidean Geometry} 3(3,0)  
732 \textbf{Projective Geometry} 3(3,0)  
741 \textbf{Introduction to Linear Programming with Applications} 3(3,0)  
751 \textbf{Fundamental Concepts of Calculus I} 3(3,0)  
752 \textbf{Fundamental Concepts of Calculus II} 3(3,0)  
761 \textbf{Probability and Statistics} 3(3,0)  
771 \textbf{Numerical Methods in Secondary School Mathematics I} 3(3,0)  
772 \textbf{Numerical Methods in Secondary School Mathematics II} 3(3,0)  
781 \textbf{History of Mathematics} 3(3,0)  
783 \textbf{Theory of Numbers} 3(3,0)  
791 \textbf{Mathematical Problems in the Curriculum} 3(3,0)
801 General Linear Hypothesis I 3(3,0)
802 General Linear Hypothesis II 3(3,0)
803 Stochastic Processes I 3(3,0)
804 Stochastic Processes II 3(3,0)
805 Data Analysis 3(3,0)
806 Nonparametric Statistics 3(3,0)
807 Applied Multivariate Analysis 3(3,0)
809 Time-Series Analysis, Forecasting and Control 3(3,0)
811 Nonlinear Programming 3(3,0)
812 Dynamic Programming 3(3,0)
813 Advanced Linear Programming 3(3,0)
814 Network Flows and Integer Programming 3(3,0)
815 Data Structures 3(3,0)
817 Stochastic Models in Operations Research I 3(3,0)
818 Stochastic Models in Operations Research II 3(3,0)
821 Real Analysis I 3(3,0)
822 Real Analysis II 3(3,0)
823 Complex Analysis I 3(3,0)
824 Complex Analysis II 3(3,0)
825 Ordinary Differential Equations I 3(3,0)
826 Ordinary Differential Equations II 3(3,0)
831 Fourier Series 3(3,0)
833 Operational Mathematics 3(3,0)
837 Calculus of Variations 3(3,0)
839 Integral Equations 3(3,0)
841 Applied Mathematics I 3(3,0)
842 Applied Mathematics II 3(3,0)
850 Computational Problems in Discrete Structures 3(3,0)
851 Abstract Algebra I 3(3,0)
852 Abstract Algebra II 3(3,0)
853 Advanced Linear Algebra 3(3,0)
854 Theory of Graphs 3(3,0)
855 Combinatorial Analysis 3(3,0)
856 Applicable Algebra 3(3,0)
861 Advanced Numerical Analysis I 3(3,0)
862 Advanced Numerical Analysis II 3(3,0)
863 Digital Models I 3(3,0)
864 Digital Models II 3(3,0)
867 Systems and Software 3(3,0)
868 Introduction to Numerical Processes 3(3,0)
871 General Topology I 3(3,0)
872 General Topology II 3(3,0)
891 Master’s Research. Credit to be arranged.
901 Probability Theory I  3(3,0)
902 Probability Theory II  3(3,0)
907 Multivariate Analysis  3(3,0)
920 Introduction to Harmonic Analysis  3(3,0)
927 Functional Analysis I  3(3,0)
928 Functional Analysis II  3(3,0)
981 Special Topics in Mathematical Statistics  1-3(1-3,0)
982 Special Topics in Analysis  1-3(1-3,0)
984 Special Topics in Applied Mathematics  1-3(1-3,0)
985 Special Topics in Algebra  1-3(1-3,0)
986 Special Topics in Convexity  1-3(1-3,0)
987 Special Topics in Numerical Processes  1-3(1-3,0)
988 Special Topics in Operations Research  1-3(1-3,0)
991 Doctoral Research. Credit to be arranged.

MECHANICAL ENGINEERING (ME)


201 Innovative Design I  2(1,3) Creative design; the design process; design planning; design analysis; design documentation; engineering professional ethics; engineering graphics as a means of conceptualization, problem solving, and communication. Preq: Sophomore standing.


301 Engineering Systems Analysis  3(3,0) Application of undergraduate mathematics, numerical methods, and basic engineering principles in the solution of engineering problems. Problems will be drawn from dynamics, vibrations, kinematics, thermodynamics, heat transfer, fluid mechanics, electrical circuits, and other engineering fields. Preq: MTHSC 208, Junior standing in engineering.

302 Dynamic Systems and Control  3(3,0) Model formulation of engineering systems based on physical laws involving the storage and transfer of matter and energy. Mechanical, electrical, fluid, and thermal systems are emphasized. Time and frequency response methods are considered. An introduction to control system characteristics of stability and feedback. Preq: EM 202, MTHSC 208.

304 Heat Transfer  3(3,0) Heat conduction in the steady and transient states; free and forced convection; radiation; combined modes; boiling and condensation. Analytical and numerical solutions to engineering heat transfer problems are emphasized. Preq: ME 311, MTHSC 208, Junior standing.

305 Engineering Experimentation  1(0,3) Introductory course to engineering experimentation. Theory and application of elementary instruments for static measurements of pressure, temperature, etc. Planning, conducting, and reporting results of the experiment. Development of experimental skills by performing experiments in the laboratory. Preq: Junior standing.

311, H311 Engineering Thermodynamics I  3(3,0) First and second laws of thermodynamics applied to engineering systems. Properties of the ideal and real gases and vapors.
Processes and introduction to power and refrigeration cycles. \textit{Preq:} MTHSC 208, PHYS 221, Junior standing.

312 Engineering Thermodynamics II 3(3,0) Continuation of ME 311. Power and refrigeration cycles, thermodynamic relations, compressibility charts, combustion, and introduction to equilibrium.


401, 601 Design of Mechanical System Components 3(3,0) Principles of the analysis and synthesis of machines. The application of engineering principles and state-of-the-art of experimental knowledge to the selection of machine elements. \textit{Preq:} EM 304.

402, 602 Innovative Design III 3(2,3) The student is given the opportunity to apply creatively his general knowledge and his knowledge of engineering in the analysis and design of one or more engineering systems, machines, or devices. A substantial portion of the design problem will involve the theory and applications of engineering economics. \textit{Coreq:} ME 401, 412.

403 Fluid Dynamics 3(3,0) The theory of fluids in motion. Topics include review of concepts of thermodynamics as applied to fluids in motion, wave propagation in a fluid, isentropic flow with variable area, Fanno line, Rayleigh line, normal and oblique shocks, flow with friction and heat transfer, viscous flow theory, potential flow theory, applications. \textit{Preq:} EM 320, ME 311, and consent of instructor.

404, 604 Control Systems Design 3(2,2) The analysis and design of feedback and control systems using principles of transient response, root locus, frequency response and state variable analyses. Experimental and analytic evaluation of laboratory control systems. \textit{Preq:} ME 302 or equivalent.

405 Kinematics and Dynamics of Machinery 3(3,0) Graphical, analytical, and numerical techniques are used in the dynamic analysis and synthesis of machines. Emphasis on the application of the analysis techniques to linkages, cams, gears, and other mechanisms. \textit{Preq:} EM 202 and Senior standing.

406, 606 Computer Control of Machines and Processes 3(2,2) Sampling and stability of discretized process models. Methods of Z-transforms, root locus and discrete time equations are employed for mathematical controller design and analysis. Computer requirements, transducers and signal converters are addressed. \textit{Preq:} ME 404 or equivalent.

407, 607 Applied Heat Transfer 3(3,0) An application oriented extension of ME 304, considering topics in transient conduction, flow of fluids, energy exchange by radiation, and mass transfer. Applications in heat-exchanger design with emphasis on economics and variation of operating conditions from the design point. \textit{Preq:} ME 304 and consent of instructor.


410, 610 Mechanical Processing of Materials 3(3,0) Qualitative and quantitative descriptions of mechanical processing of materials are presented. The mechanical and metallurgical
analysis of forging, rolling, extrusion, cutting, metal finishing and other processes are presented. Preq: CRE 310, EM 304.

411, 611 Gas Power Systems 3(3,0) A study of the effects of variation in specific heat, some fundamentals of compressible flow, the combustion process, and chemical dissociation. The theoretical and actual processes associated with the gas turbine, the thermal jet, the thermal rocket, and the spark ignition and compression ignition engines are analyzed. Preq: ME 312.

412 Introduction to Compressible Flow and Turbomachinery 3(3,0) Introductory concepts to compressible flow. Methods of treating one-dimensional gas dynamics including flow in nozzles and diffusers, normal shocks, and methods of measuring the velocity in compressible flow. Also included are theories of energy transfer and flow compressible fluid in turbomachinery. Preq: EM 320, ME 312.

413 Thermal Systems Laboratory 1(0,3) Experimental investigations in such areas as internal combustion engines, air-conditioning, refrigeration, steam turbines, steam condensers, etc. Preq: ME 304, 312, 313.

414 Mechanical Systems Laboratory 1(0,3) Investigations of natural phenomena arising within the areas of dynamics, vibrations, and elasticity. Experiments include friction, photoelasticity, critical speed of shafts, frequency response, and others. Preq: EM 304. Coreq: ME 405.

415, H415 Undergraduate Research 1-3 Individual research projects to be conducted under the direct supervision and guidance of a faculty member. May be repeated for a maximum of six credits. Preq: Consent of instructor.

419, 619 Central-Station Electric Power Generation 3(3,0) A survey of present-day techniques for generating electricity in fossil- and nuclear-fueled power plants. This includes discussion of the arrangement, function, and design of basic plant components. Methods of performing analytical design computations are developed and applied to typical design problems. Preq: ME 304, 312.

420, 620 Alternative Energy Sources and Their Utilization 3(3,0) Covers the availability and use of energy sources such as fossil fuels, solar (direct and indirect), vegetation, wastes and nuclear. Addresses energy density, constraints to use and economics of each source; waste heat via conservation, heat pumping, and direct cascade use; and economics of waste heat utilization. Preq: ME 312.

422, 622 Principles of Turbomachinery 3(3,0) The guiding principles underlying all forms of turbomachinery. A unified treatment of turbomachinery to include pumps, fans, compressors and turbines. Dimensional analysis as applied to turbomachinery. Euler's equation, concepts of specific speed, thermodynamics of turbomachinery processes, the matching of the flow characteristics of duct systems with those of turbomachines, and related topics are covered. Preq: EM 320, Senior standing.

425, 625 Kinematics: Kinematic Design of Machines 3(3,0) Graphical, analytical, and numerical synthesis techniques are applied to the design of mechanisms to meet the specified kinematic objectives of function generation, path generation, and coupler motion. Spatial mechanisms are discussed, but emphasis is on planar motion. Preq: EM 202 and consent of instructor.

429, 629 Thermal Environmental Control 3(3,0) Mechanical vapor compression refrigeration cycles, refrigerants, thermoelectrical cooling systems, cryogenics, thermodynamic properties of air, psychometric charts, heating and cooling coils, solar radiation, heating and cooling loads, insulation systems. Preq: ME 312.

430, 630 Fluid Power — Hydraulics 3(3,0) Engineering analysis of hydraulic system components and circuits. Topics covered will include hydraulic fluids, contamination and filtering, power generators, transmission lines, control valves, and system concepts. Preq: EM 320.

452, 652 Safety Engineering 3(2,3) Basic principles of industrial safety, inspections for safety compliance, design codes, design of machines and industrial equipment to meet safety
standard, fire protection and control, safety laws and regulations, protective equipment. *Preq:* Senior standing.

493 **Selected Topics in Mechanical Engineering** 1-6 A study of topics not found in other courses. *Preq:* Consent of instructor.

701 **Applications of Engineering Analysis** 3(3,0)
801 **Foundation of Fluid Mechanics** 3(3,0)
805 **Heat and Mass Transfer I** 3(3,0)
806 **Heat and Mass Transfer II** 3(3,0)
807 **Mechanical Systems** 3(3,0)
810 **Macroscopic Thermodynamics** 3(3,0)
811 **Gas Dynamics** 3(3,0)
812 **Experimental Fluid Mechanics** 3(3,0)
814 **Turbulent Boundary Layer** 3(3,0)
816 **Energy Conversion** 3(3,0)
820 **Modern Control Engineering** 3(3,0)
821 **Advanced Control Engineering** 3(3,0)
830 **Conductive Heat Transfer** 3(3,0)
831 **Convective Heat Transfer** 3(3,0)
832 **Radiative Heat Transfer** 3(3,0)
833 **Heat Transfer with Change of Phase** 3(3,0)
841 **Advanced Mechanical Engineering Design I** 3(3,0)
842 **Advanced Mechanical Engineering Design II** 3(3,0)
845 **Vibration of Continuous Media** 3(3,0)
890 **Engineering Project** 1-3(0,3-9)
891 **Master’s Research.** Credit to be arranged.
893 **Selected Topics in Mechanical Engineering** 1-6(1-6,0)
930 **Advanced Topics in Heat Transfer** 1-6(1-6,0)
991 **Doctoral Research.** Credit to be arranged.

**MEDICAL TECHNOLOGY (MT)**

*Coordinator:* M. B. Bishop


**Self Memorial Hospital (Greenwood)** *Lecturers:* J. L. Collins, R. G. Harris, C. H. Magruder, H. W. May, R. E. Proctor

101 **An Introduction to Medical Technology** 1(1,0) An introduction to the operation and practices in a medical laboratory. This course is designed to integrate the academic year with the clinical year. Included will be lectures on current laboratory practices, a visit to a modern medical laboratory, current training of laboratory personnel and seminars on areas of specialization.
401 Serology and Immunology 4(21,10,49) Presents the basic principles of serology and immunology and the tests utilizing these principles to detect abnormalities helpful in the diagnosis of disease.

402 Microbiology 7(59,6,470) The principles of microbiology-bacteriology, mycology, and parasitology. Emphasis is placed on human pathogenic organisms, using both fresh and prepared organisms.

403 Hematology 5(12,32,276) Information on blood as a tissue, the theory of hematological tests, factors that affect test reliability. Knowledge of test results and knowledge of blood dyscrasias. Skill in the performance of hematological tests is emphasized and the use of automation techniques is covered.

404 Blood Bank 3(8,20,132) History and principles of blood group systems and methods of cross matching. Testing for and quantitative determination of Rh antibodies with all available techniques. Selection, pretesting and bleeding of donors and processing of blood for transfusions.

407 Urinalysis 2(10,8,102) The study of renal function together with principles of urine analysis, pregnancy tests and anatomy of the urinary system. Emphasis is placed on laboratory procedures and their utilization to detect abnormalities helpful in the diagnosis of disease.

408 Chemistry 10(40,50,470) Introduction to the chemistry of carbohydrates, nitrogen, calcium, and phosphorous compounds, acid-base balance, etc., with emphasis on the chemistry of blood and urine using both qualitative and quantitative procedures in the laboratory.

409 Radioisotopes 1(2,0,7) Introduction to principles of diagnostic radioisotope procedures and the use of the scintillation detector, the well counter, and the scaler.

MICROBIOLOGY (MICRO)

Professors: O. W. Barnett, Jr., B. V. Bronk, M. J. B. Paynter, Head: F. J. Stutzenberger; Associate Professors: A. W. Baxter, M. G. Johnson, E. L. Kline, L. L. Larcom, J. W. Lawson; Assistant Professor: S. S. Hayasaka; Adjunct Associate Professor: H. F. Cantrell

100 Microbes and Human Affairs 1(1,0) An explanation of the roles of microorganisms in today's world and the significance of microbes to the future of mankind.

305, 605 General Microbiology 4(3,3) Morphology, physiology, classification, distribution, and cultivation of microorganisms and health. Preq: Introductory biology, CH 101, 102 or 112.

400, 600 Public Health Microbiology 3(3,0) The epidemiology of transmissible diseases including pathogenic characteristics of the infectious organism, modes of transmission, mechanism of infection, diagnostic aids, effective treatments, immunizing procedures and methods of preventing infection. Preq: MICRO 305.

401, H401, 601 Advanced Bacteriology 4(2,6) Metabolism, nutrition, growth, and death of bacteria; microbiological assays and industrial fermentation; emphasis on laboratory procedures for the identification of the more common taxonomic groups. Preq: CH 201 or 223, 227, MICRO 305.

403, 603 Marine Microbiology 3(2,3) A discussion of the microbes that inhabit the marine environment, their peculiar physiological traits, and contributions to the ecology of oceans. Preq: MICRO 305, organic chemistry.


Note: First figure represents lecture hours, second figure represents seminar hours, and the third figure represents clinical practice hours in the medical technology courses.
410, H410, 610 Soil Microbiology 3(2,3) The role of microorganisms in the decomposition of organic substances, transformation of nitrogen and mineral substances in the soil; interrelationships between higher plants and microorganisms; importance of microorganisms in soil fertility. Preq: MICRO 305.

411, H411, 611 Pathogenic Bacteriology 4(3,3) A study of pathogenic bacteria, their morphology, cultural requirements and classification; diagnostic tests, methods of differentiation, and the diseases caused. Preq: MICRO 305.

412, H412, 612 Bacterial Physiology 4(3,3) A consideration of the cytology, physiology, metabolism, and genetics of bacteria. Included will be studies of growth and death, reproduction and mutation, nutrition and metabolic pathways, regulatory mechanisms, and effects of environment. Preq: CH 224, MICRO 305, one semester of biochemistry, or consent of instructor.

413, H413, 613 Industrial Microbiology 3(2,3) Microbial aspects of large-scale processes for the production of foods, antibiotics, enzymes, fine chemicals, and beverages. Topics include strain selection, culture maintenance, biosynthetic pathways, continuous cultivation and production of single cell protein. Preq: MICRO 305.

414, H414, 614 Basic Immunology 3(2,3) A consideration of the nature, production, and function of basic immune responses in animals. Procedures and mechanisms of antigen-antibody and other immune reactions. Preq: MICRO 305, Organic Chemistry.

415, H415, 615 Microbial Genetics 4(3,3) The cytological basis of bacterial, fungal, and viral genetics; molecular aspects; mutations; mechanisms of genetic transfer; episomes and plasmids; and population changes. Preq: CH 224, GEN 302 or 305, MICRO 305, or consent of the department head.

416, H416, 616 Introductory Virology 3(3,0) A general introduction to the field of virology, including animal, bacterial, and plant viruses. Topics will include nomenclature and classification, biochemical and biophysical characteristics, mechanisms of replication, chemotherapy, and techniques for isolation, assay and purification. Preq: MICRO 305.

491 Special Problems in Microbiology 1-3(0,3-9) Research problems in the various areas of microbiology designed to introduce undergraduate students to the planning and execution of research experimentation, and the presentation of research findings.

802 Bacteriological Technic 4(2,6)
803 Special Problems in Microbiology. Credit to be arranged.
804 Current Topics in Microbiology 1(1,0)
806 Pathogenesis and Infectious Disease 3(3,0)
807 Seminar 1(1,0)
810 Recombinant DNA and Genetic Engineering in Microbes 4(2,6)
811 Bacterial Cytology and Physiology 4(4,0)
812 Bacterial Metabolism 3(3,0)
815 Advanced Microbial Genetics 3(3,0)
891 Master's Research. Credit to be arranged.
991 Doctoral Research. Credit to be arranged.

MILITARY SCIENCE (MS)

Professor: T. Archibald, Head: Assistant Professors: S. E. Crouch, W. H. Huff III, P. R. Kelley, M. H. Vernon

101 Fundamentals (Basic) 1 A study of the mission of the Reserve Officers' Training Corps, an orientation to the Department of Defense, and a study of customs and traditions of the Service. Laboratory periods provide training in marksmanship and drill. One-hour lecture per week; two-hour laboratory every other week or equivalent.
270 Description of Courses

102 General Military (Basic)  1 A study of world change and military implications and an introduction to first aid, mass casualty treatment, and drug and alcohol abuse. Laboratory periods provide training in care and maintenance of weapons and drill. One-hour lecture per week; two-hour laboratory every other week or equivalent.

201 Fundamentals of Small Unit Operations and Land Navigation  1 An introduction to small unit tactics, military maps, and terrain association. Leadership laboratory provides the student practical experience in applying principles of land navigation, confidence building, and physical fitness testing. One-hour lecture per week; two-hour laboratory every other week or equivalent.

202 Military History (Basic)  1 A survey of military history with emphasis on battles and factors which have patterned our military structure today. Leadership laboratory provides practical experience in small unit leadership and physical fitness testing. One-hour lecture per week; two-hour laboratory every other week or equivalent.

300 Military Science (Advanced)  6(ROTC 3, Elective 3) Study and application of leadership, military teaching principles, small unit tactics, and communications. Cadets will enroll in one three-hour elective offered by other departments in the University outside the student's major academic discipline. Students must participate in leadership laboratory training throughout the school year.

400 Military Science (Advanced)  6(ROTC 3, Elective 3) A study of military operations, logistics, military law, world change and military implication, and leadership laboratory. Cadets will enroll in one three-hour elective offered by other departments in the University outside the students major academic discipline. Students must participate in leadership laboratory training throughout the school year.

MUSIC (MUS)

Professor: J. H. Butler, Head; Associate Professor: B. F. Cook; Assistant Professors: E. B. Card, E. A. Freeman; Instructors: W. W. Campbell, M. H. Hamilton, L. U. Harder

151 Applied Music  1(1,0) Individual study in performance medium (voice, piano, flute, oboe, clarinet, saxophone, bassoon, cornet, trumpet, French horn, trombone, baritone, tuba, percussion). One hour-long private lesson each week, for which a minimum of four hours' practice is required. The student is guided in a continuing advance of his technical and artistic proficiency and is required to perform an appropriate solo in a student recital each semester. May be repeated for credit with departmental approval to allow for the study of differing performance media. Preq: Consent of instructor, based on a qualifying audition.

152 Applied Music  1(1,0) Continuation of MUS 151. Preq: MUS 151.

205 Music Theory  3(3,0) The terminology and notation of traditional music are reviewed, and the techniques of sight-singing and sight-reading are practiced. Harmonic practices are studied, relating to the principal diatonic triads in all inversions. Preq: Consent of instructor, based on musical literacy.

206 Music Theory  3(3,0) Continuation of MUS 205 with emphasis on secondary chord structure, modulation, and nondiatonic harmony. Advanced sight-singing and melodic dictation are practiced. Preq: MUS 205.

210 Music Appreciation: Music in the Western World  3(3,0) Designed to deepen the student's appreciation of his musical heritage through a study of the elements of the musical language and its development in Western culture.

251 Applied Music  1(1,0) Continuation of MUS 251. Preq: MUS 251 and consent of instructor.

252 Applied Music  1(1,0) Continuation of MUS 251. Preq: MUS 251.
305  Music Theory: Advanced Harmony  3(3,0)  A study of harmonic usage involving chromaticism, free dissonance and atonality. Harmonic dictation is practiced.  

306  Music Theory: Form and Analysis  3(3,0)  Principles of formal construction in music of all periods are studied by the inductive analysis of representative works.  

311  Music Appreciation: American Music  3(3,0)  Music in America from 1620 to the present. Indigenous and borrowed influences will be examined.  

315  Music History  3(3,0)  The development of Western music from antiquity to 1750, emphasizing representative literature from various styles and periods.  

316  Music History  3(3,0)  Continuation of MUS 315. Music from 1750 to present.  

361  Marching Band  1(0,3)*  Ensembles: Devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances given periodically in addition to the minimum rehearsal time; may be repeated for credit, with a maximum of four hours of ensemble credit allowable toward a degree. Fall semester only.  

362  Concert Band  1(0,3)*  Ensembles: Devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances given periodically in addition to the minimum rehearsal time; may be repeated for credit, with a maximum of four hours of ensemble credit allowable toward a degree. Spring semester only.  

365  University Chorus  1(0,3)*  Ensembles: Devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances given periodically in addition to the minimum rehearsal time; may be repeated for credit, with a maximum of four hours of ensemble credit allowable toward a degree.  

400  Music in the Elementary School Classroom  3(3,0)  Designed to give the teacher in the elementary school a familiarity with music suitable for use with children at the elementary level. Recordings of appropriate music, preband instruments, unison and part singing will be included. No previous training in music is required.  

401  Methods and Materials in Elementary School Music  3(3,0)  Materials, methods and techniques in elementary school.  

421  Vocal Arranging  3(3,0)  Techniques of arranging for voices and accompanying instruments are studied and appropriate arrangements prepared.  

422  Instrumental Arranging  3(3,0)  Transpositions, characteristics and range of the instruments of the band and orchestra are studied. Techniques of arranging for small instrumental ensembles are studied and appropriate arrangements prepared.  

NURSING (NURS)  

(Associate in Arts Degree Program)  

Associate Professors: A. S. Prevost, L. Roswal, Director; Assistant Professors: M. J. Lilley, H. Schwartz; Instructors: M. F. Barber, S. H. Gwak, L. I. Poston, E. S. Rosenwald, A. S. Welch, S. V. Whitman  

103  Nursing I  6(3,9)  Multiple teaching media are utilized in presenting concepts and developing skills required for identifying needs and intervening as a nurse to assist persons to meet their health needs.  

104  Nursing II  6(3,9)  This course deals with the need for survival of the species by reproduction. The bio-psycho-social factors involved in human reproduction and in maternal-infant nursing are identified throughout the course. The family-centered approach is used, and the

*No more than a total of four semester credit hours earned in this group of courses (MUS 361, 362, 365) may be used in meeting degree requirements.
family unit serves as a framework for the study of the nursing care of mothers and infants. Preq: ENGL 101, NUR 103, PSYCH 201, ZOOL 110.

204 Trends in Nursing 3(3,0) A course planned to consider contemporary nursing, social, legal, and ethical forces that affect the nurse, the field of nursing, and society. Discussion will focus on socio-economic aspects, legislative, health, and nursing-care issues. Preq: NURS 205, SOC 201.

205 Nursing III 7(3,12) This course is the first of two interrelated sequential courses designed to develop a knowledge of principles which can be applied when planning and giving nursing care to various age groups with major health problems (acute and long-term patients). Preq: ENGL 102, NURS 104, PSYCH 321, ZOOL 111.

206 Nursing IV 11(6,15) Continuation of NURS 205. This course deals with common health problems that interfere with ability to meet one’s basic needs and presents medical and nursing measures that support or restore the ability to achieve one’s maximum level of wellness. Preq: NURS 205, SOC 201.

NURSING (NURS)
(Baccalaureate Degree Program)


100 Orientation 1(1,0) Series of lectures and discussions on nursing and careers in nursing; personal and professional guidance.

207 Dynamics of Human Relations 3(2,3) The nursing appraisal of theoretical and clinical approaches to the understanding of the dynamics of human behavior. The identification of behaviors through observing and participating in laboratory experiences in community agencies providing service to adults and children.

209 Nursing Skills Laboratory 1(0,3) An introduction to basic nursing skills utilizing a self-paced modular approach. A self-study laboratory and nursing practice laboratory will be used in learning and practicing the skills identified in each module.

309 Human Values in Nursing 3(3,0) The values guiding nursing theory and practice, including common human needs; the nature of man and his community.

310 Perspectives in Nursing Intervention 3(3,0) Analysis of processes used in making nursing judgments. Emphasis on planning, intervention, and evaluation. Preq: NURS 309, 311, 313.

311 Nursing During Alterations in Life Patterns 5(2,9) Study of the ways in which people perceive and cope with changes in their life patterns; emphasis on the synthesis of knowledge from the arts and sciences as a basis for deliberative nursing action. Laboratory experience in a variety of settings with all age groups.

312 Nursing of the Acutely and Chronically Distressed 5(2,9) Nursing concepts based on a broad patho-physiologic approach toward understanding changes in functions as a result of stress and/or disease. Laboratory experience in agencies providing care for the mentally and physically distressed. Preq: NURS 309, 311, 313.
The Promotion of Health 3(2,3) Role of the nurse in the teaching of health in the home and in agencies concerned with the prevention of illness. Emphasis on nutrition as a positive approach to the improvement of health throughout the life cycle. Laboratory experience in clinics, homes, and selected community programs.

Nursing in the Home 3(2,3) The dimensions of caring for the ill in the home; includes early detection, treatment, and the use of resources with emphasis on continuity of care. Laboratory experience with agencies providing home care. Prereq: NURS 309, 311, 313.

Complex Nursing Intervention I 4(1,9) A synthesis of knowledge, attitudes, and skills related to the care of individuals/families with health problems requiring complex nursing interventions. Emphasis on diagnosis and intervention in the care of persons presenting into the health-care system with nursing problems resulting from illness states due to serious medical and surgical conditions. Laboratory experiences in diverse settings. Prereq: NURS 310, 312, 314.

Complex Nursing Intervention II 4(2,6) A continuation of NURS 413 with emphasis on nursing diagnosis and intervention in the care of individuals presenting into the health-care system, with nursing problems resulting from illness states due to multiple trauma, conditions requiring external life support, and conditions resulting in residual functional impairment. Laboratory experiences in diverse settings. Prereq: NURS 413, 419, 421.

The Multiproblem Family 3(2,3) Focus on the family as a unit of care. Use of the epidemiologic approach as a tool in understanding conditions influencing the family. Laboratory experience through community care facilities. Prereq: NURS 310, 312, 314.

History and Philosophy of Nursing 3(3,0) Analysis of the development of modern nursing. Emphasis will be placed on how the nursing profession articulates with society and the role of nurses as change agents. Consideration will be given to the legal and ethical implications in nursing practice. Prereq: NURS 310, 312, 314.

Current Research in Nursing 3(3,0) A study of approaches in problematic situations in nursing, with emphasis on interpretation of findings. Prereq: NURS 413, 419, 421.

Independent Study in Nursing 4(2,6) Opportunity for indepth study in an area of special interest in clinical nursing. Laboratory experience arranged. Prereq: NURS 413, 419, and consent of instructor under whom student wishes to study.

Care of the Hospitalized Child with Long-Term Illness 4(2,6) Role of nurse in caring for the child with a long-term or terminal illness with emphasis on adaptations to meeting basic child needs. Laboratory experience in facility providing hospitalization for children. Limited enrollment. Prereq: NURS 413.

Nursing Care of the Person in Crisis 4(2,6) Study of the person with an emotional crisis precipitated by either a physiological or psychological problem. Various theories concerning crisis situations and the nursing interventions necessary to deal with the person in crisis are presented. Nursing laboratory experience in a variety of settings with all age groups. Limited enrollment. Prereq: NURS 413, 419.

Teaching Role of Nurse Practitioner 4(2,6) Study of the nurse’s role in health teaching and application of principles of health promotion, maintenance, and restoration. Student selection of a variety of health teaching situations and development of learning resources. Laboratory experience in a variety of settings with all age groups. Limited enrollment. Prereq: NURS 413, 419.

Care of Individuals with Complex and Critical Illness Problems 4(2,6) Comprehensive nursing care to individuals with complex and critical illness problems. Emphasis on care of individuals with neurological, respiratory, and cardiac problems; implications for first aid and emergency care. Laboratory experience in acute-care facilities. Limited enrollment. Prereq: NURS 413, 419.
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437 Introduction to School Health Nursing 4(2,6) Role of nurse in school health programs with emphasis on the health care of the school age child in his usual environment, the home and school. Laboratory experience through schools and community care facilities. Limited enrollment. Preq: NURS 413, 419.

438 Coordination in Nursing Care 4(2,6) This course is designed to reinforce and expand the knowledge and skills needed in the coordination of nursing care. Guided activities in planning, implementing, and evaluating skilled nursing in clinical laboratory in health-care agencies. Participation in and evaluation of activities relating to the delivery of nursing-care services are emphasized. Limited enrollment. Preq: NURS 413, 419, PSYCH 321, SOC 309 or 311.

439 Nursing of the Aged 4(2,6) This course is designed to assist the senior student in bridging and synthesizing concepts extracted from a variety of disciplines and applying them to the nursing process in assessing, diagnosing, planning, implementing, and evaluating the care of the aged individual residing in the community. Limited enrollment. Preq: NURS 413, 419, PSYCH 321, SOC 309 or 311.

440 Nursing Care of the High-Risk Maternity Client and Her Infant 4(2,6) An indepth study of the high-risk maternity client, her family, and the high-risk infant. Laboratory in a variety of clinical settings. Limited enrollment. Preq: NURS 413, 419, 421.

441 Nursing Problems Related to Clients Coping with Cancer 4(2,6) Designed for increasing awareness and knowledge of the multidisciplinary approaches in oncology and the role of the oncology nurse specialist and to form a basis for viewing cancer problems within a framework for nursing research. Clinical focus is on the assistance indicated for individuals with cancer and their families. Limited enrollment. Preq: NURS 413, 419, 421.

701 Health Assessment 2(1,3)

801 Family Health Nursing 3(1,6)

805 Affiliative Expressions of Behavior in Relation to Health Care 2(2,0)

807 Seminar 1-3

812 The Dynamics of Community Health 3(3,0)

815 The Promotion and Maintenance of Health 3(1,6)

827 Foundations of Nursing Education 3(3,0)

828 The College Teacher of Nursing 3(3,0)

831 Adult Nursing I 6(3,9)

832 Adult Nursing II 6(3,9)

833 Rehabilitative Nursing I 6(3,9)

834 Rehabilitative Nursing II 6(3,9)

835 Child Health Nursing I 6(3,9)

836 Child Health Nursing II 6(3,9)

837 Maternal-Infant Nursing I 6(3,9)

838 Maternal-Infant Nursing II 6(3,9)

840 Gerontological Nursing I 6(3,9)

841 Gerontological Nursing II 6(3,9)

891 Master’s Research. Credit to be arranged.

NUTRITION (NUTR)

(See courses listed under Animal Science, Biochemistry, Dairy Science, Food Science, and Poultry Science)
Introduction to Nutrition 3(3,0)S Principles of the nutrition of domestic animals and man includes: sources, digestion, absorption, utilization and functions of nutrients; effects of dietary deficiencies; and nutrients required for maintenance, growth, reproduction, lactation, work, and egg-shell quality. Preq: BIOCH 210, CH 223, or consent of instructor.

Fundamentals of Nutrition 3(3,0)F Biochemical and physiological fundamentals of nutrition applicable to domestic animals and man. Considered are digestive processes, and absorption and metabolism of carbohydrates, lipids, proteins, water, minerals and vitamins. Energy metabolism and comparative anatomy and physiology of digestive systems are discussed. Preq: BIOCH 210, CH 223, or consent of instructor.

Nutrition and Dietetics 3(3,0) Study of the nutritional value of foodstuffs, the influence of food preparation techniques upon these values, and the development of diets to meet human nutritional requirements. Current concepts in the formulation of therapeutic diets for the treatment of the ill will be emphasized. Preq: NUTR 451 or equivalent.

Human Nutrition 3(3,0) Essentials of nutrition and principle nutritional deficiency conditions. Factors affecting adequacy of dietary intake, methods of determining nutritional status, the development of nutrition standards, and recent advances in human nutrition. Preq: Consent of instructor.

Clinical Nutrition 3(3,0) A study of diseases of nutritional etiology and their treatment. The pathogenesis, symptoms, diagnosis, and principles of nutrition therapy of each of the malnutritive disease conditions will be discussed. Preq: NUTR 451 or equivalent.

Therapeutic Nutrition 3(3,0)
Public Health Nutrition 3(3,0)
Nutrition Education 3(3,0)
Food Service Systems 3(3,0)
Nutrition Practicum 1-6(0,1-6)
Nutrition for Teachers 3(3,0)
Topical Problems in Nutrition 1-3
Monogastric Nutrition 3(3,0)
Ruminant Nutrition 3(3,0)
Nutrition of Carbohydrates and Lipids 3(3,0)
Nutrition Techniques with Large Animals 2(1,3)
Nutrition Techniques with Laboratory Animals 2(1,3)
Amino Acids and Protein Nutrition 2(2,0)
Vitamins and Minerals 4(3,3)
Nutrition Seminar I 1(1,0)
Nutrition Seminar II 1(1,0)
Master's Research. Credit to be arranged.
Doctoral Research. Credit to be arranged.

PHILOSOPHY (PHIL)
Assistant Professors: J. L. McCollough, W. A. Maker
201 Introduction to Philosphic Problems 3(3,0) A discussion of representative philosophical questions which arise from human thought and action. Characteristic topics are as follows: The Conditions of Knowledge; The Nature of Man; The Individual and Society.

202 Introduction to Logic 3(3,0) An introduction to methods of evaluating arguments. Simple valid argument forms are given which can be joined together to produce the logical form of virtually any argument. Informal fallacies may also be considered.

203 Philosophy and Current Issues 3(3,0) An introduction to philosophic reflection as found in writers from many fields analyzing today’s cultural predicaments. This social criticism is discussed in a search for the philosophic basis of some familiar conflicts over the value system implicit in our way of life.

303 Philosophy of Religion 3(3,0) A critical consideration of the meaning and justification of religious beliefs. Representative topics are as follows: The Nature and Existence of God; Religious Knowledge; Religious Language; The Problem of Evil.

304 Moral Philosophy 3(3,0) A study of moral problems, their origin in conflicts between duty and desire, and alternative solutions proposed by classical and contemporary writers.

312 Modern Philosophy 3(3,0) The development of the modern outlook as seen in the major Western philosophers of the seventeenth and eighteenth centuries. The thought of Descartes, Spinoza, Leibniz, Locke, Berkeley, Hume, Kant, and Hegel is considered, illustrating the development of rationalism, empiricism, and idealism.

318 Contemporary Philosophy 3(3,0) A study of the dominant movements in Western philosophy today, particularly existentialism and analytical philosophy. The object is to acquire sufficient background for reading current philosophical or philosophically influenced literature.

325 Philosophy of Science 3(3,0) A study of the logic of the sciences: laws, theories, scientific methods; and of the relevance of science to other human interests.

344 Current Ethical Theory 3(3,0) An intensive study of a currently prominent moral problem. Readings are selected from recent work at the frontiers of ethical thought.

PHYSICAL SCIENCE (PHSC)

(Jointly administered by the Chemistry Department and the Department of Physics and Astronomy)

101 Physical Science I — Physics 4(3,2) Introduction to physics for nontechnical students. This course includes elements of mechanics, fluids, light, and electricity.

102 Physical Science II — Chemistry 4(3,2) Introduction to chemical principles and chemical applications for nontechnical students. This course includes atomic theory, nuclear structure, chemical reactions, solutions, and typical organic compounds.

PHYSICS (PHYS)


101 Current Topics in Modern Physics 1(0,2) Demonstrations and lectures serving as an introduction to different areas of physics and astronomy will be presented by various members of the staff. These areas may include such topics as astrophysics, energy, relativity, and weather, as well as visits to the planetarium.
115 **Classical Physics I** 3(3,0) An introductory calculus-based physics course. This course covers such topics as vectors, statics and dynamics of particles, work and energy, elasticity, harmonic motion, hydrostatics and hydrodynamics. **Coreq:** A course in calculus.

116 **Classical Physics II** 3(3,0) Continuation of PHYS 115. This course covers such topics as temperature, heat flow, first and second laws of thermodynamics and their applications, solar position and energy flow, waves, acoustics, electricity, magnetism, and electric circuits. **Preq:** PHYS 115 or consent of instructor.

122, H122 **Physics with Calculus I** 3(2,2) The first of three courses in a calculus-based physics sequence. Topics include vectors, laws of motion, conservation principles, rotational motion, oscillations, and gravitation. **Coreq:** MTHSC 108.

207 **General Physics I** 4(3,2) Introductory course for students who are not majoring in a physical science or engineering. This course covers such topics as mechanics, waves, fluids, and heat. **Coreq:** A course including algebra and trigonometry.

208 **General Physics II** 4(3,2) Continuation of PHYS 207. This course covers such topics as electricity, magnetism, electromagnetic waves, optics, and modern physics. **Preq:** PHYS 207.

221, H221 **Physics with Calculus II** 3(2,2) Continuation of PHYS 122. Topics include thermodynamics, kinetic theory of gases, electric and magnetic fields, electric currents and circuits, and motions of charged particles in fields. **Preq:** PHYS 122.

222, H222 **Physics with Calculus III** 3(2,2) Continuation of PHYS 221. Topics include wave motion, electromagnetic waves, interference and diffraction, relativity, atomic particles, and atomic and nuclear structure. **Preq:** PHYS 221.

223 **Physics Laboratory I** 1(0,3) An introduction to physical experimentation on mechanical and electrical systems. Oscillatory motion and resonance are emphasized. Calculators and computers are used in statistical treatment of data. **Coreq:** PHYS 221.

224 **Physics Laboratory II** 1(0,3) Experiments involve atomic, molecular, and nuclear systems. The wave-particle dualism of light and matter is emphasized. Calculators and computers are used in statistical treatment of data. **Coreq:** PHYS 222.

240 **Physics of the Weather** 3(3,0) A descriptive introduction to meteorology. Includes atmospheric thermodynamics, solar radiation, heat budget, atmospheric circulation, force laws governing air motion, fronts, precipitation, synoptic prediction. Special topics of current interest such as the effect of environmental pollution on weather, and the effect of weather on health are included.

245 **Energy Sources for the Future** 3(3,0) A study of possible sources of energy including fossil fuels, solar energy, nuclear energy, and their uses. The basic physical concepts, the economic feasibility, and the environmental impact of the use of these sources of energy are discussed. **Preq:** One semester of a physical science.

262 **Physics of Music** 3(3,0) An elementary, nontechnical study of the relationship between the laws of physics and the production of music for the music student or layman who wishes to understand the physical principles of the art. Topics include mechanical and acoustical laws, harmonic analysis, musical scales, sound production in instruments, physiology of hearing, etc.

321, H321, 621 **Mechanics I** 3(3,0) Statics, motions of particles and rigid bodies, vibratory motion, gravitation, properties of matter, flow of fluids. **Preq:** PHYS 221.

322, H322, 622 **Mechanics II** 3(3,0) Dynamics of particles and of rigid bodies, Lagrangian and Hamiltonian formulations, vibrations of strings, wave propagation. **Preq:** PHYS 321 or consent of instructor.

325, H325, 625 **Experimental Physics I** 4(2,6) Introduction to experimental modern physics, measurement of fundamental constants, repetition of crucial experiments of modern physics (Stern-Gerlach, Zeeman effect, photoelectric effect, etc.). **Coreq:** PHYS 321 or consent of instructor.
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326, H326, 626 Experimental Physics II 4(2,6) Continuation of PHYS 325.
340, H340, 640 Electricity and Magnetism I 3(3,0) Electric potential and electrostatic fields, solutions of Laplace’s and Poisson’s equations, properties of dielectrics and of capacitors, electrostatic energy, current and treatment of circuit problems. Vector analysis is used throughout after introduction. Preq: PHYS 221.

401 Senior Thesis I 1-3 A semioriginal project performed under the direction of a physics staff member. Theoretical fields available include relativity, solid state, statistical mechanics, nuclear physics, and astrophysics. Experimental work may be done in various areas of solid-state physics, astronomy, biophysics, and atmospheric physics. Preq: Three physics courses beyond General Physics.

402 Senior Thesis II 1-3 Continuation of PHYS 401.
417, H417, 617 Introduction to Biophysics I 3(3,0) Introduction to the application of physics to biological problems. Topics include a review of elementary chemical and biological principles, physics of biological molecules, and fundamentals of radiation biophysics. Preq: MTHSC 206, PHYS 221, or consent of instructor.

418, H418, 618 Introduction to Biophysics II 3(3,0) Continuation of PHYS 417. Further work in radiation biophysics, cell population kinetics, and selected special topics such as membrane biophysics, control theory and molecular biophysics, muscle studies, irreversible thermodynamics in biophysics, enzyme physics, etc. Preq: MTHSC 206, PHYS 221, or consent of instructor.

420, 620 Atmospheric Physics 3(3,0) A study of the physical processes governing atmospheric phenomena. Topics include thermodynamics of dry and moist air, solar and terrestrial radiative processes, convection and cloud physics, precipitation processes, hydrodynamic equations of motion and large-scale motion of the atmosphere, numerical weather prediction, atmospheric electricity. Preq: MTHSC 108, PHYS 208 or 221.

432, H432, 632 Optics 3(3,0) This course covers a selection of topics, depending on the interest of the student. Topics covered may include the formation of images by lenses and mirrors, design of optical instruments, electromagnetic wave propagation, interference, diffraction, optical activity, lasers, and holography. Preq: PHYS 221.

441, H441, 641 Electricity and Magnetism II 3(3,0) Continuation of PHYS 340. Topics covered include magnetic fields and energy, magnetic properties of materials, electromagnetic induction, ac circuit problems with vector methods and complex numbers, Maxwell’s field equations with applications. Preq: PHYS 340 or equivalent.

446, H446, 646 Solid State Physics 3(3,0) An introductory treatment of the crystal structure of solids and the properties of solids which depend on crystal structure, free electron model of metals, band theory of solids, Brillouin zones, crystalline defects and diffusion. Preq: PHYS 222 or consent of instructor.

452, H452, 652 Nuclear and Particle Physics 3(3,0) A study of our present knowledge concerning subatomic matter. The experimental results are stressed. Topics discussed include particle spectra, detection techniques, Regge pole analysis, quark models, proton structure, nuclear structure, scattering and reactions.

455, H455, 655 Quantum Physics I 3(3,0) Discussion of solution of the Schroedinger equation for free particles, the hydrogen atom and the harmonic oscillator. Preq: PHYS 322, 340, or consent of instructor.

456, H456, 656 Quantum Physics II 3(3,0) Continuation of PHYS 455. Application of principles of quantum mechanics as developed in PHYS 455 to atomic, molecular, solid state and nuclear systems. Preq: PHYS 455.

457, H457, 657 Basic Health and Radiological Physics I 3(3,0) Topics discussed in this course include a survey of nuclear physics, interaction of radiation with matter, biological effects
of high and low energy radiation, and uses of radiation for therapy and diagnosis. *Preq:* PHYS 321, 340, or consent of instructor.

458, H458, 658 *Basic Health and Radiological Physics II* 3(3,0) Continuation of PHYS 457. Topics covered will include dosimetry and radiation protection, ultraviolet radiation effects, shielding calculations, thermal effects, tracer use and kinetics, and ultrasonics. *Preq:* PHYS 457 or equivalent.

460, H460, 660 *Contemporary Physics for High School Teachers* 3(3,0) Study of later developments including the measurements of atomic particles. The formulation of new laws and the modifications of old ideas needed to describe the interactions of these particles.

465, H465, 665 *Thermodynamics and Statistical Mechanics* 3(3,0) Study of temperature, development of the laws of thermodynamics and their application to thermodynamic systems. An introduction to low temperature physics is given. *Preq:* Six hours of physics beyond PHYS 222 or consent of instructor.

471, H471, 671 *Electron Microscopy* 3(2,3) This course presents an introduction to the theory, operation, and use of scanning and transmission electron microscopes. It includes a survey of specimen preparation techniques and instruction in the interpretation of micrographs. Applications in both the physical and biological sciences are discussed. *Preq:* MTHSC 106, PHYS 207 and 208, consent of instructor.

473, H473, 673 *X-Ray Crystallography* 3(2,3) Study of crystal symmetry, elementary group theory, X-ray diffraction by crystals. Experimental methods of goniometry, powder and single crystal diffraction are used to determine structures and electron density distribution. Application of X-ray diffraction to chemical, physical, and metallurgical problems.

700 *Physical Science in Elementary Schools — Physics* 3(3,0)

703 *Modern Physics for High School Teachers* 3(3,0)

711 *Origins of Physical Science* 3(3,0)

716 *Experimental Physics for High School Teachers* 4(2,4)

723 *Weather Science for Science Teachers* 3(3,0)

811 *Methods of Theoretical Physics I* 3(3,0)

812 *Methods of Theoretical Physics II* 3(3,0)

813 *Advanced Thermodynamics and Statistical Mechanics I* 3(3,0)

814 *Advanced Thermodynamics and Statistical Mechanics II* 3(3,0)

821 *Classical Mechanics I* 3(3,0)

822 *Classical Mechanics II* 3(3,0)

841 *Electrodynamics I* 3(3,0)

842 *Electrodynamics II* 3(3,0)

845 *Solid State Physics I* 3(3,0)

846 *Solid State Physics II* 3(3,0)

853 *Nuclear Physics* 3(3,0)

875 *Seminar in Contemporary Physics* 1-3(1-3,0)

890 *Directed Activities in Applied Physics* 1-6

891 *Master’s Research.* Credit to be arranged.

951 *Quantum Mechanics I* 3(3,0)

952 *Quantum Mechanics II* 3(3,0)

966 *Relativity* 3(3,0)

971 *Advanced Quantum Theory I* 3(3,0)

972 *Advanced Quantum Theory II* 3(3,0)

991 *Doctoral Research.* Credit to be arranged.
PLANT PATHOLOGY (PLPA)


401, H401, 601 Plant Pathology 3(2,2) The principles of the interrelationships between plant pathogens, their hosts, and the environment. Economically important plant diseases are used to illustrate these principles and the application of these principles to disease control. Preq: BIOL 103 and 105 or 110.

451, 651 Bacterial Plant Pathogens 3(2,3)S, Odd-numbered years. The nature, development, and control of plant diseases caused by bacteria. Taxonomic considerations, host-parasite relations and techniques used in isolating, identifying, and preserving bacterial plant pathogens. Preq: MICRO 305, PLPA 401, or consent of instructor.

456, H456, 656 Plant Virology 3(3,0)F, Even-numbered years. Plant viruses with emphasis on their morphology, biochemistry, purification and transmission: symptoms resulting from virus infection; virus-vector relationships; and serological procedures. The importance and control of plant virus diseases will be discussed. Preq: BIOL 103 and 105 or 110.


800 Advanced Plant Pathology I 3(3,0)
801 Advanced Plant Pathology II 3(3,0)
803 Fungal Plant Pathogens 4(3,3)
804 Physiological Plant Pathology 3(3,0)
805 Special Problems in Plant Pathology. Credit to be arranged.
807 Seminar 1(1,0)
808 Techniques and Methods in Plant Pathology I 1(0,3)
809 Techniques and Methods in Plant Pathology II 1(0,3)
811 Plant Disease Diagnosis I 1(0,3)
812 Plant Disease Diagnosis II 1(0,3)
891 Master’s Research. Credit to be arranged.
991 Doctoral Research. Credit to be arranged.

POLITICAL SCIENCE (POSC)


101 American National Government 3(3,0) An introduction to American National Government and politics with an emphasis on the functions of governmental organizations, the behavior of political parties and personalities, and the role of public opinion.

201 Introduction to Political Science 3(3,0) A basic introduction to the study, analysis, scope, and sources of government. Emphasis is given to the comparative institutions of government, the international relations of government, the theoretical conceptions man has entertained about government, and analysis of the ways in which man has behaved in response to government. Preq: POSC 101 or consent of instructor.
300  Special Activities  1-3(0,1-3)  This course encompasses special projects, approved by
the department head, which involve students in research, simulation, internships, or other actions
requiring the study and application of political principles, and which are engaged in for at least
one semester or its equivalent.

302  State and Local Government  3(3,0)  The structural features, functions, and legislative,
executive and judicial processes of American state and local government.

321  General Public Administration  3(3,0)  An introduction to public administration including
the elements of organization, personnel and financial management, and administrative law,
and administrative responsibility.  Preq: POSC 101, 201.

341  Political Science Methodology  3(2,1)  An introduction to political science methodology.
Examination of the different research settings and various techniques for collecting political
data. A critical review of the contemporary literature of political science. Laboratory training and
fieldwork in interviewing. Includes exercises in computer use for elementary quantitative analysis
of political data.  Preq: MTHSC 101 and POSC 101 or the equivalent or consent of the instructor.

351  Classical Political Thought  3(3,0)  Political philosophy from the pre-Socratic period

352  Modern Political Thought  3(3,0)  The early theories of the nation state in the sixteenth
century and the major political thinkers, problems and movements through the twentieth century.
Preq: POSC 101, 201.

361  International Politics  3(3,0)  An introduction to foreign policy, international law, and
international organizations.  Preq: POSC 101, 201.

371  Comparative European Politics  3(3,0)  Major emphasis on the United Kingdom,
France, Germany, and the U.S.S.R., with brief attention given to Italy and Switzerland. Current
methods of comparison will be studied and applied to the formal and informal functioning of
these governments.  Preq: POSC 101, 201.

372  Totalitarian Political Systems  3(3,0)  Continuation of POSC 371. This course will deal
specifically with the Soviet Union as an example of totalitarian political systems, with references
made to Nazi Germany and the present Eastern European political systems.  Preq: POSC 101,
201.

403  American Congress  3(3,0)  An examination of the behavior and processes of decision
making in the American Congress together with an analysis of the interaction between Congress
and the executive and judicial branches of the national government.

405  The American Presidency  3(3,0)  An examination of the organizational patterns, ad-
ministrative behavior, and political forces in the Presidency with considerable emphasis on
relations between the Presidency and Congress, the courts, and administrative-regulatory agen-
cies.  Preq: POSC 101, 201, or consent of instructor.

406  American Federal System  3(3,0)  Examination of the intergovernmental relationships
among national, state, and local governments in the United States with an emphasis on such
subjects as administrative and fiscal relations in the federal system.  Preq: POSC 101.

409, 609  Directed Study in American Institutions  3(3,0)  Supervised reading and or re-
search in selected areas of American government.  Preq: Eighteen semester hours in political
science and consent of instructor.

422, 622  Problems of Public Administration  3(3,0)  Selected views of public administra-
tion and the problems involved.  Preq: POSC 101 or consent of instructor.

423, 623  Municipal Administration  3(3,0)  Interaction of political, technical, and admin-
istrative processes in urban America.  Preq: POSC 101 or consent of instructor.

424, 624  Administrative Law  3(3,0)  Examination of the legal principles governing pro-
cedures and policy making processes of administrative agencies with emphasis upon delegation
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of powers, elements of fair administrative procedure, and judicial review and control of administrative determinations.

425, 625 Governmental Budgetary Process  3(3,0) Examination of the budgetary structures and processes at the national, state, and local levels of government. Special emphasis is devoted to the Office of Management and Budget in the national government and to the political elements of the budgetary process at all levels of government.

427, 627 Government Personnel Administration  3(3,0) Government personnel systems; current trends and problems; essentials of recruitment, classification, compensation, motivation, evaluation, training, and discipline.

428, 628 American Defense Policy Analysis  3(3,0) A study of the possibilities and problems in formulating policies of national defense. Examination of alternatives, consequences and effectiveness of current techniques in nuclear weaponry, guerrilla and conventional warfare. Preq: POSC 101, 201, or consent of instructor.

429, 629 American Politics and Education  3(3,0) A consideration of the political context for the making of public policy for education and for educational administration in the United States. Selected educational issues will be analyzed in the framework of modern political science. Preq: ED 301 or POSC 101, 201.

432 American Constitutional Law I  3(3,0) A brief introduction to the judicial process followed by a detailed examination of leading cases pertaining to the judiciary, the Congress, the Presidency, and the federal system. Preq: POSC 101, 201.

433, 633 American Constitutional Law II  3(3,0) An examination of the relationship of the individual to his government; focusing on the safeguards of liberty and property including freedoms of speech, press and religion, and criminal procedures. Preq: POSC 101, 201.

434 The Judicial Process and Jurisprudence  3(3,0) Courts as political subsystems; judicial decision making; the development of public policy through the judicial process; theories of law and jurisprudence. Preq: POSC 101, 201.

435 Administration of Justice  3(3,0) Examination of selected issues and questions adjudicated in the nation’s courts with emphasis upon the manners in which the courts and related law enforcement agencies deal with problems of deviance under the criminal law; an evaluation from a social science perspective of the courts and these related agencies as arbiters in the resolution of conflicts under the law. Preq: POSC 101, 201.

439 Public Law and American Education  3(3,0) A consideration and analysis of the constitutional standards for public education. Special emphasis will be placed on the areas of church-state relations, academic freedom, educational finance, and race relations. Preq: POSC 101.

442, 642 Political Parties and Politics  3(3,0) A study of the historical development of political parties, and the role they play in the organization and functions of our national government, and the influence of politics in policymaking. Preq: POSC 101, 201.

443 Public Opinion and Propaganda  3(3,0) This course examines the nature of public opinion, its social and political context, the social-psychological processes basic to it, the dynamics of its formation and change and its measurement. Preq: POSC 101 or consent of instructor.

453 American Political Thought  3(3,0) American political philosophy from the seventeenth century to the present with an emphasis on political and social developments since the 1770s. Preq: POSC 101, 201.

454 Southern Politics  3(3,0) Southern politics since 1950 with emphasis upon the characteristics of sectional politics, decline of the one-party system, impact of desegregation and civil rights activism, political resurgence of the South in the 1970s and its impact on national politics. Preq: POSC 101.
International Organizations 3(3,0) Emphasis on international organizations. Analysis of current problems and proposed solutions. Preq: POSC 101, 201.

United States Foreign Policy 3(3,0) Focus on foreign policy in its historical perspective, examining the decision-making process in foreign policy; evaluates contemporary American capabilities, and analyzes specific issues. Preq: POSC 101, 201.

International Law 3(3,0) An examination of cases and other legal materials on the nature of international law, recognition of states, succession, the territory of states, and nationality. Preq: POSC 101, 201.

Foreign Policies of the Major Powers 3(3,0) A study in the foreign policies of the leading world powers with special reference to the geographic, economic, historical and political determinants of each. A general introduction to the field of foreign policy. United States foreign policy is not emphasized. Preq: POSC 361.

Comparative Asian Governments 3(3,0) Major emphasis on China, India, and Japan. A study of the adaptation of three classic Asian cultures to the Western nation state system, and the particular solutions sought or found by each to the problems of modern government. Each country’s foreign policy will also be examined. Preq: POSC 101, 201, or consent of instructor.

Political Systems of Latin America 3(3,0) An examination of political processes in Latin America from both institutional and national perspectives. Preq: POSC 101, 201, or consent of instructor.

Political Systems of the Middle East 3(3,0) A comparative examination of the political processes of the Middle East, emphasizing a socio-cultural approach to the problems of political development. The overview of the course concentrates upon the Arab and non-Arab states of Jordan, Lebanon, Syria, the United Arab Republic, Iran, Israel, and Turkey. Preq: POSC 101, 201, or consent of instructor.

African Politics 3(3,0) Introduction to the politics and international relations of Africa south of the Sahara. An interdisciplinary approach will emphasize the historical, cultural, and economic influences on contemporary African political systems and foreign policies. Attention will be given to the problems of nation and state building and issues of dependency and majority rule in southern Africa. Preq: POSC 201 or consent of instructor.

The Political Novel and the Cinema 3(3,1) A consideration of how political science is treated in political novels and cinema, and how political opinions are shaped by these media. Preq: POSC 101, 201, or consent of instructor.

POULTRY SCIENCE (PS)

Professors: B. D. Barnett, Head; K. A. Holleman, J. E. Jones; Associate Professors: K. K. Hale, Jr., B. L. Hughes; Assistant Professors: G. P. Birrenkott, Jr., D. V. Maurice, D. R. Sloan

Avian Science 3(2,3) A study of the basic principles of poultry production and marketing and a fundamental study of the anatomy and physiology of the fowl. Preq: AGRIC 103 or consent of instructor.

Incubation and Hatchery Management 2(1,3)F, Even-numbered years. The course deals with the basic principles of incubation and provides fundamental instruction on the operation and maintenance of a hatchery. Preq: PS 202 or consent of instructor.

Poultry Breeding and Genetics 3(2,3) Principles of genetics and breeding of commercial fowl will be studied. This includes physiology of reproduction, mechanism of inheritance, selection methods, recordkeeping, and artificial insemination. Preq: GEN 302 and PS 202 or consent of instructor.

Poultry and Poultry Products Evaluation 2(0,4) Selection of layers, broilers, and turkeys will be studied. Grading of poultry products according to USDA grade standards will
also be studied. Students enrolled in this course are eligible to compete in Intercollegiate Poultry Judging Contests. \textit{Preq}: PS 202 or consent of instructor.

\textbf{355, 655} \textbf{Poultry Products Grading and Technology} \textit{3(2,3)F}. Even-numbered years. Factors important in the quality of poultry products will be considered. The effects of production, handling, packaging and storage on consumer acceptability will be discussed. Quality evaluation will be considered from the standpoint of tenderness, flavor, microbiology, and USDA grades.

\textbf{359, 659} \textbf{Management of Egg, Broiler and Turkey Enterprises} \textit{3(2,3)S}. Odd-numbered years. The application of technology to the production of commercial eggs, broilers and market turkeys. The application of labor and equipment to animal requirements in such a way as to result in efficient production of wholesome meat and eggs.

\textbf{363} \textbf{Propagation of Game and Exotic Birds} \textit{3(2,3)} Study of the techniques of production in confinement of game and exotic birds for use in recreation and for ornamental purposes. Discussion of the use of various avian species for nonfood purposes in the home, parks, zoos, and in hunting preserves.

\textbf{400, 600} \textbf{Avian Physiology} \textit{4(3,3)} Detailed study of the structure and function of organ systems of avian species with emphasis on digestion and reproduction. Students will be given an opportunity to study organ system(s) of their choice using quantitative physiological techniques. \textit{Preq}: ANPH 301, PS 202, or consent of instructor.

\textbf{401, H401, 601} \textbf{Animal Environmental Technology} \textit{2(2,0)F}. Even-numbered years. A study of the physiological response of all domestic animals to environmental factors of importance in their production. Physical aspects of light, temperature, humidity, and the gaseous environment and control of these factors by housing systems, ventilation, artificial light, insulation, and waste disposal will be discussed. \textit{Preq}: AGRIC 103, ANSC 202, PS 202.

\textbf{403, 603} \textbf{Animal Environmental Technology Laboratory} \textit{1(0,3)F}. Even-numbered years. Demonstrations of subjects covered in PS 401.

\textbf{405, 605} \textbf{Topical Problems} \textit{1-3(0,3-9)} Topics of interest to the student at senior, master, doctor, and professional levels. The course is designed to give experience with avian problems not covered in other courses or on thesis research. Credit varies with the problem selected.

\textbf{451, 651} \textbf{Poultry Nutrition} \textit{2(2,0)F}. Odd-numbered years. The nutrient requirements of chickens, turkeys, and game birds and methods of determining these requirements will be discussed. Deficiencies and excesses of vitamins and minerals and the effects of naturally occurring toxins are considered. Hand formulation and linear programming are introduced.

\textbf{454, 654} \textbf{Least Cost Feed Formulation} \textit{2(1,2)F} Study of least cost formulation of animal diets. Encompasses development of ingredient composition tables, nutrient specifications, along with formulation evaluation. Linear programming and computers will be used. \textit{Preq}: NUTR 201, 401, or PS 451.


\textbf{460, 660} \textbf{Seminar} \textit{1(1,0)S}. Odd-numbered years. Current research reported in journals covering the various areas of avian science. Students will practice scientific writing and interpretation of technical material for lay readers. \textit{Preq}: Consent of instructor.

\textbf{471} \textbf{Practicum} \textit{1-4(0,2-9)} Practical, supervised experience in an approved organization dealing with poultry production, processing, or distribution. The student will submit monthly reports during the practicum and will conduct a departmental seminar at its conclusion. \textit{Preq}: Junior standing and consent of instructor.

\textbf{804} \textbf{Poultry Pathology} \textit{3(1,6)}

\textbf{805} \textbf{Seminar} \textit{1(1,0)}

\textbf{891} \textbf{Master’s Research}. Credit to be arranged.
PSYCHOLOGY (PSYCH)

Associate Professors: L. Berger, S. N. Cole, J. D. Davenport, Head; D. J. Senn; Assistant Professors: E. G. Brainerd, Jr., A. S. Dawes, J. D. Frey, C. Furry, R. H. Lowe, R. H. Nowaczyk, L. I. Park, N. R. Schultz, Jr.; Visiting Assistant Professor: P. J. Gill

101 Orientation to Psychology 1(1,0) A general orientation to the field of psychology; emphasis on areas treated by the discipline as well as interests which psychologists hold in common. Not open to students who have taken PSYCH 201.

105 Psychology of Occupational Choice 1(1,0) Techniques of personnel selection, career development, and vocational counseling as applied to the individual seeking a vocation. Topics to be discussed include matching oneself to a job, how to apply for various jobs, and the measurement of job success.

201, H201 General Psychology 3(3,0) An introduction to the study of behavior. An analysis of the biological bases of behavior, learning, thinking, motivation, perception, human development, social behavior, and the application of basic principles to more complex phenomena such as education, personal adjustment, and interpersonal relations.

263 Introductory Experimental Psychology 3(3,0) A survey of the major areas of psychological research with emphasis on methods of experimentation and other forms of research. Required of all Psychology majors and minors. Preq: PSYCH 201.

265 Introductory Experimental Psychology Laboratory 1(0,3) Demonstrations and applications of principles of experimental methodology discussed in PSYCH 263. Coreq: PSYCH 263.

301 Industrial Psychology 3(3,0) Topics in personnel selection, including application forms, testing and interviews, job analysis, performance appraisal, and achievement tests, the applied use of learning principles, supervisory training methods, discovery of training needs, motivation and morale in industry, consumer psychology, financial incentive plans, and organizational theories. Preq: PSYCH 201.

302 Social Psychology 3(3,0) A survey course analyzing human social behavior from the perspective of the individual as a participant in social relationships. The major emphasis is on the scientific study of such contemporary social processes as attitude formation and change, interpersonal relations, conformity, conflict resolution, aggression and violence, social communication, and group phenomena. Preq: PSYCH 201.

303 The Psychology of Adjustment 3(3,0) A course in personal adjustment dealing with the appropriate and inappropriate reactions to frustration and stress, including ways of handling conflicts, anxiety, fears, and the promotion of personal emotional adjustment. Not included in the Psychology major. Preq: PSYCH 201 or consent of instructor.

305 Applied Psychology 3(3,0) A study of the concepts of psychology as applied to individual, business, and professional behavior. Preq: PSYCH 201.


321 Developmental Psychology 3(3,0) A survey of current theory and research concerned with the psychological aspects of human growth and development. Preq: PSYCH 201.

323 Personality 3(3,0) An examination of the contributions of psychological theories and current research to the study of personality. Major topics include stress and psychological trauma, frustration and aggression, adaptive personality changes, conflict and defensive reactions, and personality development. Preq: PSYCH 201.

325 Human Sexual Behavior 3(3,0) The subject of sexual behavior is to be approached from the psychophysiological, behavioral, and cultural points of view. Evolutionary, historical, and cross-cultural perspectives will be considered.
332 Principles of Behavior 3(2,3) A study of basic conditioning principles including classical conditioning, operant conditioning, and imitation. Initial emphasis on animal studies followed by human applications and techniques. Laboratory work will include animal handling and training. Preq: PSYCH 201, 263.

341 Physiological Psychology 3(3,0) The study of human neuroanatomy, with an emphasis on the functions of the nervous system. Treats of the biological bases of behavior in both normal and abnormal dimensions. Preq: PSYCH 201, 263.

344 Physiological Psychology Laboratory 1(0,3) Demonstrations and techniques of selected physiological procedures are presented to elucidate the principles discussed in PSYCH 341. Coreq: PSYCH 341.

361 Motivation 3(3,0) The various aspects of motivation are considered through a study of contributions of biologists, sociologists, anthropologists, and psychologists. The orientation is empirical rather than theoretical, with emphasis on pertinent research and applications and on the measurement of motives. Preq: PSYCH 201.

363 Advanced Experimental Psychology 4(3,3) Continuation of PSYCH 263 with a stress on the carrying out of original research in the scientific study of human and animal behavior. Laboratory periods stress the refinement of techniques and the execution of research in a guided setting. Preq: PSYCH 201, 263, 265, and achievement of a satisfactory score on the departmental competency examination.

402, 602 Abnormal Psychology 3(3,0) The study of the physiological, psychological and sociological factors involved in such behavioral disorders as transient situational disturbances, personality disorders, psychoneuroses, psychoses, and psychosomatic disturbances. Special emphasis is placed on the advantages and disadvantages of particular conceptual models in labeling and describing behaviors as either normal or abnormal. Preq: PSYCH 201 and one psychology course higher than 300.

408 Human Factors Psychology 3(3,0) Principles of human behavior as they relate to the use of man-made objects and facilities in the environment; psychological factors that influence human performance. Preq: PSYCH 201, 263, 265, or equivalent methodology course.

411 Personalized Instruction Methods 3(2,3) A consideration of the behavioral principles underlying the Personalized System of Instruction approach. Students will utilize these principles while serving as proctors for the introductory psychology course. Preq: Admission by invitation only.

423, 623 Theories of Personality 3(3,0) An analysis of classical and contemporary theories of personality, with an emphasis on the theories of Freud, Jung, Skinner, Rogers, Cattell, Sheldon, and the neo-Freudians. Preq: PSYCH 201, 323, or consent of instructor.

425 The Psychology of Aging 3(3,0) A special consideration of the social, biological, and cultural aspects of aging. Included is the influence of aging on the senses and perception, psychomotor skills, learning, thinking and intelligence, employment and productivity, personality changes, and psychopathology. Preq: PSYCH 201.

432 Behavioral Techniques 3(2,2) A survey of specific techniques that employ psychological principles to deal with maladaptive human behavior. The techniques include systematic desensitization, assertive training, modeling, operant conditioning, extinction, and aversive conditioning. Preq: PSYCH 201, 263, 332, 402.

442, 642 Sensation and Perception 3(3,0) Continuation of PSYCH 341. Psychophysics, sensory neurophysiology, and perceptual processes related to vision, hearing, and the other senses. Preq: PSYCH 201, 263, 265.

444, 644 Sensation and Perception Laboratory 1(0,3) Selected experiments are conducted to demonstrate the phenomena involved in sensation and perception. Coreq: PSYCH 442.
451 Systems and Theories of Psychology 3(3,0) A treatment of the science of psychology as understood in the light of the ideas of men who have been responsible for its development. Preq: PSYCH 201.

471 Psychological Test Evaluation 3(3,0) An introduction to the theory of psychological testing. Emphasis is on essentials of testing with experience in administering, scoring, and interpreting tests, including those of scholastic achievement, mental ability, scholastic aptitude, interests and personality. Preq: PSYCH 201, 263, 265, and nine additional hours of psychology or consent of instructor.

475 Group Dynamics 3(3,0) A review of current research and theory on small-group processes with special emphasis on group structure, the dynamic forces within a group, social power, group problem solving, and leadership. Preq: PSYCH 201, 302, or consent of instructor.

482 Attitudes and Persuasive Communication 3(3,0) A review of current research and major theoretical positions concerning the processes involved in attitude formation, attitude organization, and attitude change. Primary emphasis will be on the role of attitudes in modern society, the structure and composition of persuasive communication, and the application of techniques of persuasion. Preq: PSYCH 201, 302, or consent of instructor.

487 Practicum in Applied Psychology 3(1,5) Designed to give the student practical experience in the application of psychology in industry. The student will begin a project which will aid in the solution of some industrial problem. Problems to be studied include labor turnover, coordination of managerial and staff decision making, motivation, and organizational development. Preq: PSYCH 301, 302, or consent of instructor.

490, 690 Special Topics in Clinical Psychology 3(3,0) Selected aspects of clinical psychology related to counseling, psychotherapy, psychological assessment and its relationship with psychiatry, social work, and other mental health disciplines. Preq: PSYCH 263, 402, and six hours of 300-400 level psychology courses, or consent of instructor.

493 Practicum in Clinical Psychology 3(1,5) Students will have an opportunity to apply classroom theory in solving individual and community problems through interaction with community agencies and other professional groups in the mental health area. The student will have limited but well-controlled contact with patients on both an individual and group basis. Preq: Consent of instructor.

494 Topical Seminar in Social Psychology 3(3,0) A topical seminar on current theory and research in a selected subject area of social psychology. The specific seminar topic will change from semester-to-semester. Topics will be announced prior to each semester’s registration. Preq: PSYCH 201, 302, and consent of instructor.

497 Directed Studies in Psychology 2(2,0) Study of a particular topic area in psychology under the direction of a faculty member. Specific program is to be organized by the student and faculty member and submitted to the department head for approval. May be repeated for a maximum of four credits. Preq: PSYCH 363 and consent of instructor.

499, 699 Current Issues in Psychology 3(3,0) Reading and discussion of research being published in current psychological and related journals. For advanced psychology students. Preq: PSYCH 201, 363, or consent of instructor.

RECREATION AND PARK ADMINISTRATION (RPA)


101 Introduction to Leisure Services 3(3,0) Introduces recreation professions and organizations: government, voluntary, and commercial. Overviews professional preparation. Out-
lines development of man's uses of leisure and evolution of recreation, city parks, natural
resources conservation and preservation movements as philosophical forces affecting leisure
services.

102 Issues in Leisure Services 3(3,0) Considers current trends, problems, laws, and is-
issues affected by and/or affecting recreation in America. Preq: RPA 101 or consent of instructor.

203 Personal and Community Health 3(3,0) The course deals with health problems, dis-
ease prevention and control, school health practices, public health administration, and other
health information which may enable one to live intelligently in today's complex society.

204 Sports in Recreation 3(2,3) Administrative and supervisory skills indigenous to public
and/or private agency athletic programs are considered. Group instruction is given in individual
and team sports and officiating techniques applicable to these sports are taught.

205 Leisure Programs I 3(2,3) Principles and methods of program development. Time
and facility utilization for sports activities, social functions, arts and crafts, outdoor activities,
hobbies or special-interest groups, and activities in the cultural and performing arts will be

206 Leisure Programs II 1(0,3) Provides the opportunity for a student to conduct a rec-
reation program in a supervised setting. A minimum of 90 hours with a leisure agency approved
by the University is required. To be taken on a Pass-Fail basis only. Preq: RPA 205, Sophomore
standing in Recreation and Park Administration.

207 Leisure Programs III 1(0,3) Continuation of RPA 206. Experience will be gained in
a leisure situation different from the RPA 206 exposure. A minimum of 90 hours with a leisure
agency approved by the University is required. To be taken on a Pass-Fail basis only. Preq:
RPA 205, Sophomore standing in Recreation and Park Administration.

300 History and Philosophy of Recreation Service Agencies 3(3,0) A comprehensive
study of the history and philosophy of recreation service agencies that includes recreation
programs as an integral part of their purposes and objectives. Course includes such agencies
as the Boy Scouts, Girl Scouts, YMCA, YWCA, Red Cross, boys' clubs, girls' clubs, college
unions, and others.

302 Camp Organization and Administration 3(2,3) Surveys the development and trends
of camping in America. Considers programming for the operations of agency and private camps.
Enables student to master the techniques of group living. Laboratory offers practical experience
in camp craft including trips and outdoor cooking.

305 Safety in Recreation 3(3,0) The course includes the physiology of exercise as it relates
to recreational sports and recreational activities, certification in first aid, and the beneficial effects
of recreation. Safety aspects of recreational activities and risk recreation are also covered.

307 Park Maintenance and Operation 3(2,3) Maintenance techniques and materials. Job
planning and scheduling problems of overuse and preventive maintenance are included.

308 Leadership and Group Processes in Recreation 3(3,0) Leadership is analyzed
through experience-based learning. Various styles of leadership and communication and their
probable consequences are examined. Techniques for planning of large and small group meet-
ings are considered. Examination is made of literature in the field of leadership and group
processes.

311 Therapeutic Recreation 3(3,0) Examination of the profession of therapeutic recreation
by analyzing the history, philosophy, concepts, roles, and functions involved in therapeutic
recreation services.

320 Recreation Policymaking 3(3,0) Structures and processes for public park and/or rec-
reation policy formation in the United States. Preq: POSC 101 or consent of instructor.

321 Recreation Administration 3(3,0) An analysis of the internal organization of a rec-
reation department dealing with finances and accounting, records and reports, publicity and
public relations, state and federal legislation, staff organization, coordination of community resources. *Preq:* Junior standing.

330 Introduction to Environmental Interpretation 3(3,0) An introduction to the philosophy and principles of the art of environmental interpretation. A comprehensive survey of interpretive theory as it applies to the recreation and parks practitioner and the varying settings within the profession.

390 Special Projects in Recreation and Parks 1(1,0) Comprehensive studies and investigation of special topics not covered in other courses. Emphasis will be placed on field studies, community service and independent readings. May be repeated for a maximum of 3 credits. *Preq:* Junior standing and consent of instructor.

400, 600 Supervision of Recreation Personnel Patterns and Processes 3(3,0) A comprehensive study of the supervisory process in relation to individuals, programs, and groups in recreation agencies. *Preq:* IM 307, RPA 308, or consent of instructor.

403 Elements of Recreation and Park Planning 3(2,3) Basic recreation and park planning principles and processes, trends in area and facility development combine to form the basis for formulation of a relevant knowledge and philosophy of planning. *Preq:* Senior standing.

405 Field Training in Recreation 8(0,24) The student, in a ten-week program, has the opportunity to observe recreation programs in operation. The student will also have responsibilities of organizing and conducting activities under supervision. Maintenance and operation of facilities will be observed and practiced. Total of 360 hours required. To be taken Pass-Fail basis only. *Preq:* Senior standing in Recreation and Park Administration; grade-point ratio equivalent to Clemson University graduation requirement.

409 Methods of Recreation Research I 3(3,0) An analysis of the principle methods of recreation research, the application of descriptive statistics to recreation research, and the development of a research proposal. *Preq:* Senior standing.

410 Methods of Recreation Research II 3(3,0) A continuation of RPA 409 to include the supervised execution and reporting of the results of the research proposal developed in RPA 409 and the application of inferential statistics to recreation research. *Preq:* RPA 409 or consent of instructor.

411, 611 Therapeutic Recreation for Selected Populations 3(2,3) Therapeutic recreation services for the mentally retarded, aging, and incarcerated populations. Emphasis is directed to planning services appropriate to the needs of clients and to the goals of the various agencies and institutions. *Preq:* RPA 311 or consent of instructor.

412, 612 Therapeutic Recreation and Mental Health 3(3,0) Therapeutic recreation services in mental health clinics, institutions, and outdoor settings. Review of disorders and current modes of treatment as they relate to therapeutic recreation. *Preq:* RPA 311 or consent of instructor.

413, 613 Therapeutic Recreation for Physically Disabled 3(2,3) Examination of the potential psychological, physical, and sociological implications of disability to the individual and to the planning and direction of therapeutic recreation services. *Preq:* RPA 311 or consent of instructor.

421, 621 Recreation Financial Resources Management 3(3,0) Analysis of recreation financial resources management. Deals with revenue sources and their allocation. *Preq:* RPA 321 and Senior standing in Recreation and Park Administration.

431, 631 Methods of Environmental Interpretation 3(2,3) Practice and instruction in the use of equipment and methods available to the interpreter in public contact work. Coaching in presentation and evaluation of live programs and in design, execution, and evaluation of mediated programs will be the major emphasis. Programs will be delivered to public audiences in the Clemson area. *Preq:* RPA 330, Senior standing in Recreation and Park Administration, or consent of instructor.
432, 632 Historic Site Interpretation 3(3,0) The development and implementation of the specialized interpretive programs required at historic sites. An overview of the historic movement in the United States and its presentation to the American people. Preq: RPA 330.

433, 633 Introduction to Museology 3(2,3) An introduction to the museum concept with insight into current museum practices. Course will include principles and methods of museum practice including conservation/restoration techniques. Preq: RPA 330.

441, 641 Commercial Recreation 3(3,0) Components of offering leisure services and products to the public by individuals, partnerships, and corporations for the purpose of making a profit.

442, 642 Tourism 3(3,0) A survey of travel and tourism in the United States with focus on terminology, demographics, financial significance, and trends. Preq: RPA 441.

701 Philosophical Foundations of Recreation and Park Administration 3(3,0)
702 Group Processes in Leisure Services 3(3,0)
703 Seminar in Recreation and Park Administration 3(3,0)
704 Comprehensive Recreation Planning 3(3,0)
705 Recreational Aspects of Water Resources 3(3,0)
706 Urban Reaction Analysis 3(3,0)
707 Principles of Environmental Interpretation 3(3,0)
708 Selected Topics 3(3,0)
709 Special Problems 1-3(1-3,0)
710 Current Issues in Recreation 1(1,0)
811 Research and Evaluation in Recreation 3(3,0)
815 Therapeutic Recreation and Activity Therapy Administration 3(3,0)
820 Recreation Resource Policy Issues and Processes 3(3,0)

RELIGION (REL)
Assistant Professors: L. J. Greenspoon, C. H. Lippy

300 Nature and Forms of Religious Experiences 3(3,0) The variety of religious experience and expression in human life.
301 The Old Testament 3(3,0) A survey of books of the Old Testament with special consideration given to the development of the concepts, institutions, and theology of the ancient Hebrews.
308 Religions of the Ancient World 3(3,0) Selected religious movements in ancient Mesopotamia, Egypt, Canaan, and the Greco-Roman world with emphasis on movements outside of the Judeo-Christian tradition.
309 Oriental Philosophies and Religions 3(3,0) A study of the philosophical and religious teachings of Hinduism, Buddhism, Confucianism, and Taoism.
310 Religion in the United States 3(3,0) The development of religion in the United States from the Colonial period to the 20th century. Attention will be devoted to analyzing broad currents in religious movements and religious thought which have given shape to the American pluralistic experience.

RURAL SOCIOLOGY (RS)
Professors: J. E. Faris, Head; E. L. McLean; Assistant Professor: T. A. Lyson
301 Rural Sociology 3(3,0)F  A study of human social relationships as influenced by life in the open country and in small towns and villages including considerations of the rural population, rural social institutions, processes of change in agricultural technology, and community area planning and development.

359, 659 The Community 3(3,0)F  An examination of the sociological aspects of contemporary communities and of their growth and development. The structural relations of social class, status and power and the relationships among social institutions within the community are examined. Emphasis is placed on the organization and development of communities in a constantly changing environment.

401, 601 Human Ecology 3(3,0)  Analysis of the interrelationships between man and his natural and man-made environments; study of settlement patterns, social organization, and institutions of human populations. Special emphasis will be given to interdependence of natural resources, human resources, and man-land relationships. Preq: Consent of instructor.

471, 671 Demography 3(3,0)  Demographic concepts, theory, and research methods for vital statistics, migration, and population distribution and projections; the collection and processing of demographic data, and the organization of demographic data systems. Preq: SOC 341 or equivalent.

881 Special Problems in Rural Social Research 3(3,0)

RUSSIAN (RUSS)

Lecturer: L. A. Savitsky

101, H101 Elementary Russian 4(3,1)  Training in pronunciation, grammatical forms, and syntax with a view to giving the student the fundamentals necessary to read simple Russian texts. Three hours a week classroom instruction and one hour a week in the language laboratory.


201, H201 Intermediate Russian 3(3,0)  A brief review of RUSS 101 and 102, with conversation, composition, and dictation, and the beginning of more serious reading of Russian prose in short stories and plays. Preq: RUSS 102.

202, H202 Intermediate Russian 3(3,0)  Conversation, composition, and dictation based on readings of more difficult Russian prose than in the earlier courses. Preq: RUSS 201.

303 Survey of Russian Literature I 3(3,0)  Literary movements and authors from the beginning to 1850. Preq: RUSS 201, 202.

304 Survey of Russian Literature II 3(3,0)  Literary movements and authors from 1850 to the present. Preq: RUSS 201, 202.

SAFETY AND HEALTH (SH)

Professor: C. R. Smith; Associate Professor: E. W. Arp, Jr.; Instructor: P. F. Petersen

201 Scope of Occupational Safety and Health 3(3,0)  Safety history, supervisor safety, and the Occupational Safety and Health Acts requirements of general industry.

301 Industrial Accident Prevention and Loss Control I 3(3,0)  Philosophies and techniques involved in development of accident prevention and loss control methods, procedures, and programs. The principles and concepts relating to the identification, appraisal, and correction of accident and loss-producing conditions.

302 Industrial Accident Prevention and Loss Control II 3(3,0)  Continuation of SH 301. Technical aspects of industrial accident prevention and loss control. Preq: SH 301 or consent of instructor.

303 Introduction to Industrial Hygiene 3(3,0)  The physiologic response to stress of the industrial environment is considered. Industrial toxicology and the philosophy of threshold limit
values will be discussed. Environmental criteria and systems of standards are investigated. Chemical and biological stresses are emphasized. \textit{Preq}: CH 102 or consent of instructor.

\textbf{304 Industrial Hygiene Practice 4(3,3)} Problems of evaluation and control of industrial exposure are considered. Sampling theory, study design, and survey technique are discussed. Control principles are presented. Instrument calibration, field sampling, and data interpretation will be investigated in the laboratory. \textit{Preq}: SH 303 or consent of instructor.

\textbf{401 Fundamentals of Fire and Explosion 3(3,0)} The first of a two course sequence will present the theory of combustion, principles of detection, and fundamentals of control agents. Products of combustion and the response of humans and building materials are discussed. \textit{Preq}: SH 302, 303, or consent of instructor.

\textbf{402 Fire Protection and Prevention 3(3,0)} Analysis of fire safety problems; design of adequate protection and prevention measure; and concentration in the areas of construction, occupancy, exposure, and protection as they apply to the industrial environment. \textit{Preq}: SH 401.

\textbf{404 Seminar in Safety and Health 3(3,0)} Directed readings and reports on recent advances or issues concerned with safety and health. Issues of ethics, policy, costs, and relations among business, society, labor, and government are stressed. \textit{Preq}: SH 304, 401. \textit{Coreq}: IM 415.

\textbf{410 Safety in Building Construction 3(3,0)} The fundamentals of accident prevention and the Occupational Safety and Health Act as they apply to the planning, design, and construction stages of construction projects.

\textbf{SOCILOGY (SOC)}


\textbf{201 The Sociological Perspective 3(3,0)} An introduction to the sociological perspective; study of contemporary society from the perspective of social structure and social behavior. Not open to students with credit for SOC 204.

\textbf{202 Social Problems 3(3,0)} A survey of major social problems in the contemporary United States.

\textbf{204 Social Organization 3(3,0)} An introduction to the discipline and profession of sociology; emphasis on the problem of order, the central theme in sociology. First required course for Sociology majors.

\textbf{206 Introduction to Methods of Sociological Research 3(3,0)} An introduction to the use of scientific methods in sociology, their purpose, and limitations; the relationship between theory and research; research design, sampling, measurement, reliability, and validity. Required of all Sociology majors. \textit{Preq}: SOC 201 or 204.

\textbf{208 Elements of Sociological Theory 3(2,2)} Elements of sociological theory with emphasis upon contemporary theoretical perspectives and the construction and verification of theoretical models. Laboratory exercises in model building and theory construction. Required of all Sociology majors. \textit{Preq}: SOC 201 or 204.

\textbf{302 Introduction to Social Services 3(3,0)} An introduction to the social service fields and profession; emphasis on socio-cultural factors affecting the development of social services. \textit{Preq}: SOC 201 or 204.

\textbf{304 Social Service Delivery Systems 3(3,0)} Fundamental elements of an integrated approach to social service practice by means of various delivery systems. \textit{Preq}: SOC 302.

\textbf{305 Sociological Approach to Law Enforcement 3(3,0)} A sociological analysis of contemporary law enforcement in the overall criminal justice process. \textit{Preq}: SOC 201 or 204.
309 Marriage and Family Relations 3(3,0) An examination of courtship, marriage and family development in America; the problems and alternative forms of marriage and family in contemporary American society. Preq: SOC 201 or 204.

311 The Family 3(3,0) A cross-cultural analysis of the family as a basic social institution; the history, structure, and functions of the family in various cultures; effects of social change on the family. Preq: SOC 201 or 204.

321 Introductory Anthropology 3(3,0) Man as a biosocial animal, including theory of evolution and archaeological evidence of physical and cultural development, with emphasis on the relation of man to the environment. Preq: SOC 201 or 204.

322 Cultural Anthropology 3(3,0) The general nature of human culture; emphasis on the constants and variants in human behavior affecting technology, social relations, social control, family systems, language, religion, and art. Preq: SOC 201 or 204.

324 Social and Cultural Change 3(3,0) An examination of theory and research on the processes of change; factors inducing or inhibiting change; the character, mechanisms, rate, extent, direction, and relative stabilization of change at different levels of social phenomena. Preq: SOC 201 or 204.

331 Urban Sociology 3(3,0) A study of urbanization as a social process and related changes in such areas as work, family structure, social mobility, and lifestyle; analysis of the problems confronting contemporary urban man and how these problems might be resolved in the future; special consideration of changing technology and development of cities in the future. Preq: SOC 201 or 204.

341 Population and Society 3(3,0) A study of the social, economic, and political consequences of population structure and change; illustrations from developing countries, less developed regions, and the United States; discussion of theories of growth, migration, fertility, and mortality; problems of food and resources; population goals and policies. Preq: SOC 201 or 204.

343 Sociology of Death 3(3,0) The sociological study of death and dying as social processes; concerned with how various aspects of death are defined and with plans of action which man develops to guide him as he confronts death. Topics will include bereavement, death as social behavior, attitudes toward death, suicide, euthanasia, etc. Preq: SOC 201 or 204.

351 Industrial Sociology 3(3,0) Industry as a social organization; the factory as a social system; personality in industrial relations; power groupings within industry; industry and the community. Preq: SOC 201 or 204.

361 Collective Behavior 3(3,0) Spontaneous, transitory and sporadic group behavior: crowds, panic**, riots, fads, and social movements. Preq: SOC 201 or 204.

381 Socialization and Interpersonal Behavior 3(3,0) The effects of society upon interpersonal behavior; topics include socialization, self-concept, attitude formation and change, interpersonal attraction, and social power and influence. Preq: SOC 201 or 204.

391 Sociology of Deviant Behavior 3(3,0) Analysis of advanced theory and research on the social processes by which behavior becomes defined as deviant, the conditions promoting such behavior, and the career patterns of deviant persons. Preq: SOC 201 or 204.

393 Crime in Society 3(3,0) The nature, extent, and causes of criminal behavior; societal attempts to control crime; social responses to crime, criminals, and the criminal justice system. Preq: SOC 201 or 204.

405 Community Development 3(3,0) Community development as a planning process involving decision-making, problem solving, and goal achievement. Preq: SOC 201 or 204.

420 Advanced Research Methods 3(2,3) Advanced analysis of scientific methods in social research; consideration of various techniques, methodological approaches, and research designs; laboratory experience in various phases of research. Preq: SOC 201 or 204; 206, 208.
294 Description of Courses

421, 621 Contemporary Sociological Theory  
A survey of the development of sociological theory in the twentieth century. 
*Preq:* SOC 201 or 204; 206, 208.

431, 631 Applied Organizational Sociology  
The analysis of administrative organizations and voluntary associations; applied analysis of their formal and informal group relations, communications, and effectiveness. 
*Preq:* SOC 201 or 204.

433 Sociology of Aging  
Theories of aging and the social impact of aging populations on social institutions such as schools, retirement systems, pensions, and the like are considered. Alternative systems to those in practice are considered along with special problems of early retirement. 
*Preq:* SOC 201 or 204.

441 Social Stratification  
Class, status and power in society; class differences in behavior, values, social mobility. 
*Preq:* SOC 201 or 204.

443 Religion in Society  
A sociological analysis of religious systems and movements and their impacts on social institutions. 
*Preq:* SOC 201 or 204.

451, 651 Sociology of Health and Illness  
Socio-biological factors relating to the origin, prevention, and treatment of illness; an examination of the organization of health-care delivery systems. 
*Preq:* SOC 201 or 204.

461 Sociology of Sex Roles  
Analysis of female and male socialization, statuses, roles, and opportunities in the major institutions of contemporary society, with cross-cultural comparisons; consideration of demographic, technological, and social developments likely to affect the sex roles of the future. 
*Preq:* SOC 201 or 204.

481 Racial and Ethnic Relations  
The study of the problem of racial and ethnic groups in adjusting to American society. The nature and causes of prejudice and discrimination. Programs for the reduction of intergroup tensions and conflicts are evaluated in light of observed facts and sociological principles. 
*Preq:* SOC 201 or 204.

490 Rehabilitation Systems for Criminal Offenders  
An introduction to and analysis of the problems of society in dealing with the incarceration, punishment, rehabilitation, and reintegration into society of persons handled by the criminal justice system. Course covers historical, philosophical and legal framework of institutions, probation, parole, and comparative rehabilitative efforts. 
*Preq:* SOC 201 or 204.

492 Juvenile Delinquency  
A detailed study of deviance and delinquency among juveniles; major emphasis upon factors affecting juvenile behavior and societal reactions to delinquency. 
*Preq:* SOC 201 or 204.

494 Law and Society  
The manner in which law, as a means of social control, has developed in society and the effect it has on other social institutions. The relationship of law to crime and deviancy. The proliferation and emergence of law as central to social organization in modern societies. 
*Preq:* SOC 201 or 204.

495 Field Experience  
Students participate in selected field placements under supervision for eight hours weekly and in a one-hour seminar per week. May be repeated for a maximum of six credits. 
*Preq:* Fifteen hours of sociology including SOC 204, 206, 208, and consent of department head.

498 Independent Study  
Individual readings or projects in sociological areas not covered in other courses. A written proposal must be approved by the instructor directing the work and by the department head prior to registration. 
*Preq:* Consent of department head.

499 Seminar in Selected Topics in Contemporary Sociology  
Sociological areas of current interest will be explored. May be repeated by special arrangement for a maximum of six credits. 
*Preq:* Consent of department head.
SPANISH (SPAN)

Professor: G. J. Fernandez; Associate Professor: M. M. Sinka; Assistant Professors: B. G. Durham, S. C. King, R. F. Mixon, P. F. Parrado, L. T. Perry, L. E. Seamon, J. M. Whitmire; Lecturer: E. G. Fernandez

101, H101 Elementary Spanish 4(3,1) A course for beginners in which the essentials of grammar are taught and a foundation is provided for a conversational and reading knowledge of the language. Three hours a week of classroom instruction and one hour a week in the language laboratory.

102, H102 Elementary Spanish 4(3,1) Continuation of SPAN 101.

201, H201 Intermediate Spanish 3(0) A brief review of SPAN 101 and 102, with conversation, composition, and dictation, and the beginning of more serious reading of Spanish prose in short stories and plays. Preq: SPAN 102.


205 Elementary Spanish Conversation and Composition 3(3,0) Intensive oral and written training in Spanish through conversation groups, speeches, written compositions, and controlled vocabulary acquisition. Required of all Spanish majors and minors. May be taken concurrently with SPAN 202, 303, or 311. Preq: SPAN 201.

299 Foreign Language Drama Laboratory 1(0,3) Participation in foreign language drama productions. No formal class meetings, but an average of three hours per week in a foreign language drama workshop for production. May be repeated for a total of three semester credits. Preq: Consent of instructor directing the play.

303 Survey of Spanish Literature I 3(3,0) Literary movements, influences, and authors from the beginnings to the end of the seventeenth century. Representative works, discussions. Required of Spanish majors. Preq: SPAN 201, 202.

304 Survey of Spanish Literature II 3(3,0) Literary movements, influences, and authors from the eighteenth century to the present. Required of Spanish majors. Preq: SPAN 201, 202.

305 Intermediate Spanish Conversation and Composition I 3(3,0) Practice in spoken Spanish with emphasis on vocabulary, pronunciation, intonation, and comprehension. Some written work to increase accuracy. Assignments in the language laboratory. Preq: SPAN 202 or consent of department head.

306 Intermediate Spanish Conversation and Composition II 3(3,0) A continuation of SPAN 305 with more emphasis on written Spanish. Preq: SPAN 305 or consent of the Head of the Department of Languages.

307 Spanish Civilization 3(3,0) A study of the significant aspects of the culture of Spain from its origins to the present. Preq: SPAN 202 or consent of the Head of the Department of Languages.

308 Spanish-American Civilization 3(3,0) A study of the significant aspects of the culture of Spanish-American countries from the pre-Colonial period to the present. Preq: SPAN 202 or consent of the Head of the Department of Languages.

311 Survey of Spanish-American Literature 3(3,0) Literary movements, influences, authors, and works from the Colonial period to the present. Preq: SPAN 202 or consent of department head.

401 Modern Spanish Literature 3(3,0) The generation of 1898 to the Civil War: Readings from Unamuno, Azorin, Valle-Inclán, Antonio Machado, Ortega y Gasset, García Lorca, and Alejandro Casona. Preq: SPAN 303, 304, or 311.

402 Contemporary Spanish Literature 3(3,0) Spanish literature from the Civil War reconstruction period to the present with emphasis on the contemporary novel and theatre. Preq: SPAN 303, 304, or 311.
296 Description of Courses

409  **Advanced Grammar and Composition 3(3,0)**  An intensive study of syntax and stylistics through composition and translations. Practice in spoken Spanish.  
*Preq:* Senior standing or consent of department head.

422  **The Contemporary Spanish-American Novel 3(3,0)**  New trends in the development of the Spanish-American novel from the 1940's to the present.  
*Preq:* SPAN 303, 304, or 311.

435  **Contemporary Hispanic Culture 3(3,0)**  A study of social, political, economic, and artistic manifestations of contemporary Hispanic culture.  
*Preq:* SPAN 307, 308, or consent of department head.

440  **Practical Communication Skills 3(3,0)**  A study of those communication skills (correspondence, composition, legal, medical, technical, and business terms) essential to effective communication with native Spanish speakers in these areas.  
*Preq:* SPAN 305, 306, or consent of department head.

498  **Independent Study 1-3(1-3,0-3)**  Directed study of selected topics in Spanish language, literature, and culture.  
*Preq:* Consent of department head.

499  **Spanish Literature, Language, and Culture 3(3,0)**  Selected topics and themes that have characterized Spanish literature, language, and culture throughout the centuries. May be repeated for a maximum of six credits.  
*Preq:* SPAN 303, 304, 311, or consent of department head.

**SYSTEMS ENGINEERING (SE)**

*Professors:* J. A. Chisman, J. C. Martin;  
*Associate Professors:* E. R. Baker IV, T. E. Burke, R. M. Harnett, E. L. Thomas, Jr.,  
*Director*

450, 650  **Introduction to Systems Engineering 3(3,0)**  Definition of systems engineering, fundamental concepts of systems engineering, subsystems, environments for systems, microscopic aspects of systems. Problem definitions of technical and economic environment, theory of value and needs and decision making are studied.  
*Preq:* MTHSC 206 and E&CE 317 or equivalent, or consent of instructor.

452, 652  **Reliability Engineering 3(3,0)**  A probabilistic approach to assessing system reliability. Methods for analyzing serial, parallel, and complex systems include decomposition and cut-set analysis. Reliability life testing and its acceleration are covered. Essential elements of maintainability are identified and related to system availability.  
*Preq:* E&CE 317 or consent of instructor.

480, 680  **Introduction to Methods of Operations Research 3(3,0)**  Methods and applications of selected topics from operations research. Topics include linear programming, nonlinear programming, dynamic programming, queuing theory, Markov processes, and simulation.  
*Preq:* MTHSC 206 and E&CE 317 or equivalent, or consent of instructor.

481, 681  **Linear Methods of Operations Research and Applications 3(3,0)**  Methods and applications of methods for solving linear problems in operations research. Topics include primal and dual simplex algorithms, revised simplex algorithm, sensitivity analysis, decomposition and partitioning, transportation and assignment problems, network analysis, and goal programming.  
*Preq:* SE 480 or equivalent or consent of instructor.

484, 684  **Engineering Economic Analysis 3(3,0)**  Basic principles and techniques of economic analysis of engineering projects. Consideration of time value of money, short- and long-term investments, replacement analysis, depreciation methods, cost allocation and measures of cost effectiveness.  
*Preq:* Senior standing in Engineering or consent of instructor.

486, 686  **Work-Flow Systems and Control 3(3,0)**  Fundamentals underlying the determination of production capacity requirements, economic lot sizes, and the regulation of flow and storage of materials to, within, and from the production system. Elements of forecasting, determination of materials requirements, scheduling, inventory control, etc. Consideration of data processing methods.  
*Preq:* Consent of instructor.
TEXTILE CHEMISTRY (TC)


303 Textile Chemistry 3(3,0) A study of the properties and reactions of aliphatic and aromatic organic compounds. Emphasis will be placed on mechanistic interpretations and the development of synthetic schemes leading to polyfunctional compounds of the types encountered in the textile industry. Preq: CH 102, MTHSC 206.

304 Textile Chemistry 3(3,0) Fundamental principles of physical and organic chemistry with emphasis on areas frequently encountered in the textile industry including thermodynamics, kinetics, and solution properties. These concepts will be applied to the study of aliphatic organic compounds and organic reaction mechanisms. The basic principles of stereochemistry and conformational analysis will be developed. Preq: TC 303.

305 Textile Chemistry Laboratory 1(0,3) An introduction to the techniques used in the synthesis and characterization of organic compounds. Coreq: TC 303.

306 Textile Chemistry Laboratory 1(0,3) The techniques used in the synthesis of organic compounds and the measurement of their physio-chemical properties. Coreq: TC 304.

315, 615 Introduction to Polymer Science and Engineering 3(3,0) The chemistry of monomers and polymers and the chemical and physical properties of polymers are discussed emphasizing fiber forming, synthetic polymers. Kinetics of polymerization, molecular characterization, structure, morphology, and mechanical properties of polymers are studied demonstrating design of polymer systems for end use in textiles. Preq: CH 201 and 330 or 224, TC 304, or consent of instructor.

316, 616 Chemical Preparation of Textiles 3(2,3) The chemicals used in the preparation of fabric for dyeing and finishing. Oxidizing and reducing agents and their control and effect on various fibers. Colloidal and surface active properties of various compounds and the fundamental factors influencing these properties.

317 Polymer and Fiber Laboratory 1(0,3) High polymers, prepared from monomers, are characterized and spun to make fibers. Chemical and physical properties of fiber forming polymers are measured as functions of parameters critical to properties of textiles. Coreq: TC 315.
457, 657  Dyeing and Finishing I  3(3,0)  A study of the different classes of dyestuffs and the chemistry of their applications to different fibers. The theories, principles and mechanisms for the dyeing of textile fibers and fabrics will be presented as well as the reaction mechanisms of various finishing agents applied to different substrates. *Preq: TC 315.*

458, 658  Dyeing and Finishing II  3(3,0)  The kinetics and equilibria of dyeing processes. The use of conductivity, diffusion and other methods useful for measuring absorption of isotherms and dyeing rates and the general thermodynamic relationships applicable to dyeing operations. Fiber properties such as zeta potential, dye sites, relative amorphous area available will be included.

459, 659  Dyeing and Finishing Laboratory I  1(0,3)  The course will introduce the student to common dyeing and printing methods and to some of the machinery necessary to carry out dyeing operations. *Coreq: TC 457.*

460  Dyeing and Finishing Laboratory II  1(0,3)  The course will cover finishing in addition to dyeing operations and their instrumental control. *Coreq: TC 458.*

475, 675  Cellulose Chemistry  2(2,0)  The organic chemistry of cellulose and its derivatives is developed from the basic principles of carbohydrate chemistry. Emphasis is placed on the substitution and degradation reactions which are of particular importance in textile applications. Fiber morphology is treated in relation to its effect on textile chemical processing. *Preq: TC 315 or consent of instructor.*

811  Polymer Science I  3(3,0)
812  Polymer Science II  3(3,0)
821  Chemistry of Natural Polymers  3(3,0)
831  The Physical Chemistry of Dyeing  3(3,0)
891  Master’s Research. Credit to be arranged.

**TEXTILE SCIENCE AND TEXTILE TECHNOLOGY (TEXT)**


122  Introduction to Textiles  2(1,3)  An introduction to the broad fields of textile, fiber and polymer science and engineering with emphasis on the description and formation of polymers, fibers, yarns, and fabrics including nonwoven structures and the dyeing, finishing, and chemistry and physics of textiles, fibers and polymers.

301  Fiber Processing I  3(2,2)  A study of fibrous materials and their relationship to the fiber processing systems. The objectives, theories, principles, and mechanisms of the machines used in the earlier stages of fiber processing. The course is directed primarily to the staple fiber processing systems. Mechanical and mathematical fundamentals are applied to the machines concerned.

302  Fiber Processing II  3(2,2)  Continuation of TEXT 301 emphasizing the later stages of fiber processing for the ultimate yarn strand. *Preq: TEXT 301.*

305  Basic Fibers  3(3,0)  A thorough survey of the origin, characteristics and properties of various textile fibers, both natural and man-made. The classification, identification, and the principal fields of applications will be studied.

306  Yarn Formation  3(3,0)  A fundamental study of the various systems of yarn formation from natural and man-made fibers and their blends. The course provides for the basic understanding of machines, theories and operations.

311  Fabric Development I  3(2,2)  A study of the basic theory of the cam loom weaving machine. The principles of designs of the basic plain, twill, and sateen fabric, and other weaves
such as the honeycomb, the mock leno, and the huckaback weave. Weave analysis and preparation of necessary drafts are included.

312  Fabric Development II  3(2,2)  A study of the theory and operation of the dobby head, Knowles head, Staubli dobby, Jacquard head, and multicolor selection for the above looms. Weave design for compound fabrics using two or more systems of warp and filling threads for three dimensional weaves, weave analysis, and preparation drafts are covered. *Preq: TEXT 311.*

313  Fabric Formation  3(3,0)  An examination of the theories involved in the assembly of fibers and yarns into fabrics. The application of design, analysis and production of woven, knitted and nonwoven fabrics. A brief survey of the fabric producing machines.

314  Dyeing and Finishing  3(3,0)  The concepts of current procedures and future trends in the textile finishing industry are examined. The preparation of fabrics, dye processes and the application of various materials used in the finishing process are presented.

321, 621  Fiber Science  3(2,2)  Fiber properties and the scientific evaluation of these properties. Dimensional, mechanical, optical, electrical, thermal, and moisture relationships are established and investigated.

322, 622  Properties of Textile Structures  3(2,2)  Yarn and fabric properties, their scientific significance and analysis. Dimensional, structural, and mechanical interrelationships are established and evaluated.

324  Textile Statistics  3(3,0)  An introduction to statistics with particular application to the textile industry. Measures of central value and variation, probability, the normal curve, tests of hypotheses, elementary correlation and regression. *Preq: Junior standing.*

333  The Textile Arts  3(2,3)  A survey of the development of the hand loom from prehistoric times to the present. Studio work in the elements of handwoven fabrics, their design, analysis and production on four-harness counterbalance and jack looms. *Preq: Junior standing or consent of instructor.*

403, 603  Fiber Processing III  3(2,2)  The concepts of current fiber processing machines, techniques, practices, and their validity are investigated. Problems are assigned that require use of acquired knowledge, textile testing equipment, and processing machines. The relation of fibrous material properties and processing dynamics to the fiber assemblies produced is studied. *Preq: TEXT 301, 302.*

411, 611  Fabric Development III  3(2,2)  A study of specifications and loom details for the production of fabrics woven to the customer's order to include multicolor layouts. Warp and filling preparation are covered as well as size formulations and their methods of application. Warping and dressing plans are developed for the warper and the slasher. *Preq: TEXT 312.*

414  Nonwoven and Knitted Structures  3(3,0)  A survey of nonwoven and knitted structures dealing with the principles and mechanisms involved. Various systems are covered with emphasis on yarn requirements and fabric properties.

426, 626  Instrumentation  3(3,0)  The principles of industrial and process instrumentation and process control. Static and dynamic characteristics of measurement devices. Transducer techniques for measurement of physical properties such as pressure, temperature, flow, weight, etc. Principles of process controllers.

428  Textile Research  1-3  An investigation of a problem in textile, fiber, or polymer science under the direct supervision of a faculty member. After completing the research, the student prepares a formal written report which is presented orally. *Preq: Senior standing or consent of instructor.*

429  Textile Research  1-3  Same as TEXT 428.
440, 640  **Color Science  3(2,3)**  The application of the science of color to industrial practice in textiles, plastics, paints, lighting, and ceramics. The laboratory work will be performed on modern instruments and computers.

450  **Textiles in Sports and Recreation  3(3,0)**  This course provides a basic understanding of the various types of fabrics used in athletic and recreational activities. Methods and procedures for the evaluation of fabric performance and properties as well as criteria for the selection and care of textile materials used in sports and recreational activities are provided.

460, 660  **Textile Processes  3(3,0)**  Survey of machinery and processes of textile manufacturing from fiber formation through fabric finishing. For students with a nontextile background.

475  **Textile Marketing  3(3,0)**  An examination of the activities involved in the distribution of textile products in today's market. Emphasis will be placed on the role of consumer research and the analysis of fashion in the design and promotion of textile products.

701  **Applied Science Technologies  3(2,4)**

821  **Fiber Physics  3(3,0)**

835  **Textile Structures  3(3,0)**

840  **Advanced Color Science  3(2,3)**

866  **Fiber Formation  3(3,0)**

870  **Advances in Textile Manufacturing  3(3,0)**

880  **Selected Topics  3(3,0)**

891  **Master's Research. Credit to be arranged.**

991  **Doctoral Research. Credit to be arranged.**

**WILDLIFE BIOLOGY (WB)**

*Professor: S. B. Hays, Head; Associate Professors: A. G. Eversole, L. G. Webb; Assistant Professors: T. T. Fendley, J. W. Foltz, J. R. Sweeney*

306  **Wildlife Resources of the Southeastern United States  2(2,0)F, S** A study of the wildlife resources of the Southeastern states, including population trends, life histories and economic importance. Conservation and proper utilization by man is emphasized. Not open to students who have had WB 412 or ZOOL 411.

412, H412, 612  **Wildlife Management  3(2,3)** Basic principles and general practices of wildlife management and conservation will be covered. Major problems concerning the management of wildlife resources, with emphasis on upland game species. Laboratory work includes practical work on the Clemson University woodlands and field trips to several areas where wildlife management is being practiced.

416, 616  **Fishery Biology  3(2,3)** Principles underlying freshwater fish production. Introduction to major groups of freshwater fishes and their habitats. Topics include identification, age and growth, fecundity, food habits, population estimation, environmental evaluation, management practices, and fish culture. *Preq: One year of introductory biology and Junior standing.*

460, 660  **Biology of Marine Organisms  3(2,3)** A study of the biology of common marine fauna with emphasis on economically important species. Lectures include discussion of adaptive significance of the structure and physiological characteristics of selected faunal groups in relation to their ecological distribution. Laboratory includes field trips to various marine environments. *Preq: BIOL 104, 106, or consent of instructor.*

462, H462, 662  **Aquatic Productivity  3(3,0)** Study of selected topics in oceanography and limnology with special reference to fundamental work on organic productivity. Class consists of lectures and discussions of ecological principles of biochemical cycles, energy transfer, trophic levels, and productivity of aquatic systems. Includes consideration of related topics in the development and utilization of marine resources. *Preq: ZOOL 201, 202, or consent of instructor.*
463 Special Problems in Wildlife Biology and Fisheries Sciences 1-3(0,3-9) Research problems in selected areas of wildlife and fisheries sciences to introduce the student to experimental design, research techniques, and presentation of research results. Preq: Consultation with and consent of the appropriate staff member.

490 Practicum 1-4 Supervised wildlife biology learning opportunity, providing highly individualized experiences to complement other programs and courses. Must be prearranged at least two months in advance. Must file written report midway during enrollment period and at its conclusion. Must appear for oral evaluation at the end of the period. Preq: Junior standing and consent of instructor.

809 Wildlife Biology Seminar I 1(1,0)
810 Wildlife Biology Seminar II 1(1,0)
815 Principles of Wildlife Biology 3(2,3)
816 Applied Wildlife Biology 3(2,3)
818 Ecology and Management of Wetland Wildlife 3(2,3)
840 Impoundment and Stream Management 3(2,3)
850 Aquaculture 3(3,0)
852 Parasites and Diseases of Marine Animals 3(2,3)
856 Directed Studies and Fieldwork in Marine Biology 4(2,6)
863 Special Problems 1-4(1-4,0)
891 Master's Research. Credit to be arranged.

ZOOLOGY (ZOOL)


100 The Biology of Human Survival 1(1,0) A biological overview of those aspects of contemporary life which constitute threats to the individual and the social welfare of man now and in the future: rampant reproduction, venereal disease, illegitimacy, sterility, crowding, famine, death control, genetic engineering, and hallucinogenic drugs.

110 Integrated Basic Science as Related to Man I 4(3,3) A general course surveying basic biological principles, chemistry, microbiology, genetics, human anatomy, and physiology, emphasizing the chemical and physical bases for physiology. Preq: Admission to Associate in Arts Nursing program or consent of instructor.

111 Integrated Basic Science as Related to Man II 4(3,3) Continuation of ZOOL 110. Preq: Admission to Associate in Arts Nursing program or consent of instructor.

201 Invertebrate Zoology 4(3,3) A survey of the phyla of invertebrate animals, including their taxonomy, morphology, development, and evolution. Preq: BIOL 111 or consent of instructor.

202 Vertebrate Zoology 4(3,3) An introductory study of vertebrates, emphasizing selected aspects of gross, microscopic, and developmental structure and basic function from a phylogenetic point of view. Preq: BIOL 111 or consent of instructor.

222 Human Anatomy 4(3,3) A basic and systematic study of human anatomy designed for non-Zoology majors. Preq: BIOL 104, 111, or equivalent.

223 Human Physiology 4(3,3) A basic and systematic study of human physiology designed for non-Zoology majors. Preq: BIOCH 210 and ZOOL 222 or consent of instructor.

302 Description of Courses

340, H340 Cell Biology 4(3,3) Introduction to structure, function, and diversity of cells, and cell biological technique, emphasizing biomembranes, cell cycle, energy transduction, motility, secretion and cellular digestion, with a focus on animal cells. Preq: BIOCH 301 or consent of instructor.

350, H350 Developmental Biology 4(3,3) Events and mechanisms responsible for the development of multicellular animals. Gametogenesis, fertilization, embryonic development, cellular differentiation, morphogenesis, larval forms and metamorphosis, asexual reproduction, regeneration, malignancy, and aging will be analyzed in terms of fundamental concepts and control processes. Preq: ZOOL 340 or consent of instructor.

403, H403, 603 Protozoology 3(2,3) Taxonomy of the subkingdom protozoa with special reference to the parasitic forms directly affecting man. Representative types of free-living forms are surveyed with emphasis on their morphology, physiology and distribution. Preq: ZOOL 201 or consent of instructor.

405, H405, 605 Animal Histology 4(3,3) A structural and functional study of the basic tissues of animals and the tissue makeup of organs. Mammalian histology is stressed but comparative histology will be incorporated. The course is directed toward study at the light microscope level. Detailed study of selected cells will utilize electron micrographs. Preq: ZOOL 202 or consent of instructor.

410, H410, 610 Limnology 4(3,3) A detailed introduction to the physical, chemical, and biological interrelationships that characterize inland water environments. A fundamental approach to the interactions of components of the environment is developed at the theoretical level. Field and laboratory instruction in techniques of analysis are utilized to illustrate applications of theoretical concepts. Preq: ZOOL 201, 411, General Chemistry.

411, H411, 611 Animal Ecology 4(3,3) A fundamental approach to basic ecological principles underlying the interrelationships of organisms with their abiotic environment. A variety of aquatic and terrestrial ecosystems will be studied both in the field and in the laboratory. Preq: MTHSC 301, ZOOL 201 and 202, or consent of instructor.

412, H412, 612 Aquatic Ecology 4(3,3) A study of ecological principles in aquatic systems, emphasizing functional relationships and productivity of biotic communities as they are influenced by the dynamics of physical, chemical, and biotic environmental parameters. Preq: BOT 441, ZOOL 411, or consent of instructor.

415, 615 Introduction to Mathematical Ecology 3(3,0) This course will focus on current and broadly applicable mathematical models in ecology emphasizing ecological assumptions underlying mathematical approaches, theories and limitations of specific models, and the ecological insights provided. Preq: MTHSC 108 and ZOOL 411 or consent of instructor.

420, H420, 620 Principles of Evolution 3(3,0) Introduction to the fundamental principles and major concepts of the evolutionary process in animals, including a consideration of evolutionary theories, adaptive processes in populations and major evolutionary patterns. Preq: GEN 302 or 305, or consent of instructor.

421, 621 Advanced Invertebrate Zoology 4(3,3) A survey of the interstitial fauna of marine sands will be made with reference to habitat characteristics, ecology, physiology, morphology, and systematics. The taxa presented will include cnidaria-actinulida, gastrotricha, gnathostomulida, turbellaria, nematoda, tardigrada, kinorhyncha, archannelida, various arthropod taxa, and other groups. Field trips included. Preq: ZOOL 201 or consent of instructor.

450, H450, 650 Comparative Vertebrate Embryology 4(3,3) A comparative study of the developing vertebrate body from fertilization through organogenesis. Patterns of reproduction and embryonic development, morphogenesis, organogenesis, and the functional differentiation of cells and tissues will be considered. Preq: ZOOL 350 or consent of instructor.
456, 656 Parasitology 4(3,3) Introduction to the phenomenon of parasitism in the animal kingdom with emphasis on basic principles. Classical and experimental approaches to the study of parasitism are examined in reference to the protozoa, helminths and arthropods. Preq: ZOOL 201.

457, 645, 657 Comparative Physiology 4(3,3) A comparative study of physiological processes throughout the animal kingdom. Laboratories will introduce the use of basic instrumentation and will provide an opportunity to perform original experiments. Preq: ZOOL 340 or consent of instructor.

458, 645, 658 Cell Physiology 4(3,3) Chemical and physical principles of function, largely at the cellular level. Laboratories will demonstrate the principles discussed and will provide an introduction to methodology. Preq: ZOOL 340 or consent of instructor.

459, 645, 659 Systems Physiology 4(3,3) Physiological systems (neural, muscular, skeletal, endocrine, circulatory, respiratory, digestive, and excretory) of vertebrates and their homeostatic controls. Preq: ZOOL 202, 340, or consent of instructor.

462, 662 Herpetology 3(2,3) Systematics, life history, distribution, ecology, and current literature of amphibians and reptiles. Laboratory study of morphology and identification of world families, and U.S. genera, as well as all southeastern species. Field trips will be required. Preq: ZOOL 202 or consent of instructor.

463, 663 Ichthyology 3(2,3) Systematics, life history, distribution, ecology, and current literature of fish. Laboratory study of morphology and identification of U.S. genera, as well as all southeastern species. Field trips will be required. Preq: ZOOL 202 or consent of instructor.

464, 664 Mammalogy 3(2,3) Origin, evolution, distribution, structure, and function of mammals, with laboratory emphasis on the mammals of South Carolina. Field collection required. Preq: ZOOL 202 or consent of instructor.

465, 665 Ornithology 3(2,3) The identification, life history and ecology of birds. Field trips, work with bird specimens and correlated reading will give the student a working knowledge of at least 100 species of the common birds. Preq: ZOOL 202 or consent of instructor.

470, 670 Animal Behavior 3(3,0) Historical and modern developments in animal behavior emphasizing the evolutionary and ecological determinants of behavior. A synthesis of ethology and comparative psychology. Preq: ZOOL 202 or consent of instructor.

471, 671 Animal Behavior Laboratory 1(0,3) Laboratory exercises that explore the behavior of animals. Emphasis is on behavioral observation and analysis and presentation of findings in a report format. Preq: ZOOL 202, 470, or consent of instructor.

475, 675 Vertebrate Endocrinology 3(3,0) Introduction to the basic principles of neuroendocrine integration and homeostatic maintenance in vertebrates. Comparative morphology and physiology of various endocrine tissues and hormone chemistry and modes of action are considered. Preq: ZOOL 202, organic chemistry, or consent of instructor.

476, 676 Experimental Vertebrate Endocrinology Laboratory 2(0,6) Laboratory to demonstrate principles discussed in ZOOL 475. Experiments conducted by individuals will be drawn from classical papers which demonstrate specific endocrine functions; original experiments will examine hormonal effects on selected physiological parameters, and assays and determinations of unknown hormones will be made. Preq: ZOOL 475 or consent of instructor.

480, 680 Analysis of Development 3(3,0) Concepts, problems, and experimental observations central to the study of cellular differentiation and development, particularly in animals. Emphasis is on the critical reading of research literature on the control of genetic expression and nucleo-cytoplasmic, cell-cell, and cell-environmental interactions. Preq: ZOOL 350 or consent of instructor.

491 Special Problems in Zoology 2-4 Library and laboratory experience in experimental design and research in selected biological disciplines. Results will be presented in an open
Description of Courses

seminar and in a research paper to be evaluated by at least two faculty members. May be taken for credit no more than twice for a maximum of 8 credits. *Preq:* Junior or Senior standing and consent of instructor.

493 Undergraduate Seminar 1(1,0) Exploration of current zoological literature in topical areas. *Preq:* Junior or Senior standing.

701 Man's Impact on Ecology 3(3,0)
803 Population Dynamics 4(2,6)
810 Behavioral Ecology 3(3,0)
812 Seminar 1(1,0)
813 Evolution 2(2,0)
815 Physiological Ecology 4(3,3)
816 Advanced Ecosystem Analysis I 4(3,3)
817 Advanced Ecosystem Analysis II 4(3,3)
818 Community Ecology 4(3,3)
835 Interpretative Electron Microscopy 3(3,0)
852 Principles and Methods of Systematic Zoology 2(2,0)
856 Helminthology 3(2,3)
861 Special Topics 1-4(1-4,0)
863 Special Problems 1-4
865 Advanced Ornithology 3(3,0)
881 Methods in Developmental Biology 2(0,6)
883 Special Topics in Evolutionary Biology 1-4(1-3,0-3)
884 Special Topics in Physiology 1-4(1-3,0-3)
885 Special Topics in Ecology 1-4(1-3,0-3)
886 Special Topics in Animal Behavior 1-4(1-3,0-3)
887 Special Topics in Cellular and Developmental Biology 1-4(1-3,0-3)
888 Special Topics in Organismal Biology 1-4(1-3,0-3)
891 Master's Research. Credit to be arranged.
991 Doctoral Research. Credit to be arranged.
Aarnes, William Hale, Visiting Assistant Professor of English. BA, Oberlin College, 1969: MA, Catholic University, 1970; MA, 1975, PhD, 1979, Johns Hopkins University
Abernathy, Atwell Ray, Professor of Environmental Systems Engineering. AB, Lenoir-Rhyne College, 1953: MSPH, 1959, PhD, 1963, University of North Carolina
Abramovitch, Rudolph Abraham, Head of Chemistry and Geology Department: Professor of Chemistry. BS, Alexandria University, 1950: PhD, King’s College (England), 1953: DSc, University of London, 1964
Acker, James, Assistant Professor of Accounting and Finance. BS, University of South Carolina, 1958; MEd, Clemson University, 1965; EdD, North Carolina State University, 1971
Ackerman, Carl Willis, Associate Professor of Animal Science. BS, 1953, MS, 1960, Clemson University
Acorn, John Thomson, Head of History and Visual Studies Department: Professor of History and Visual Arts. BA, Montclair State College, 1959: MFA, Cranbrook Academy of Art, 1961
Acton, James Crockett,* Professor of Food Science. BS, 1965, PhD, 1970, University of Georgia
Adair, Joseph Henry, Assistant Professor of Education. AB, 1948, BD, 1951, Johnson C, Smith University; MEd, Furman University, 1967
Addison, Clarence Lee Benjamin, Associate Professor of Building Science. BArch, Howard University, 1959; MArch, Clemson University, 1974
Adkins, Theodore Roosevelt, Jr., Professor of Entomology and Economic Zoology. BS, 1952, MS, 1954, PhD, 1958, Auburn University
Aitken, James Bruce, Professor of Horticulture, Sandhill Experiment Station. BS, 1962, MS, 1964, Clemson University; PhD, University of Florida, 1967
Alajajian, Charles John, Assistant Professor of Electrical and Computer Engineering. BS, Purdue University, 1974: MS, 1976, PhD, 1979, University of Illinois
Alam, Kursheed, Professor of Mathematical Sciences. BS, 1941, MS, 1943, Patna Science College; PhD, University of Minnesota, 1963
Albert, Harold Edward, Professor of Political Science. BS, Madison College, 1957; BD, United Theological Seminary, 1960; MAT, Miami University (Ohio), 1960; PhD, Florida State University, 1972
Alberts, James Joseph, Adjunct Associate Professor of Zoology. BA, Cornell College, 1965; MS, Dartmouth College, 1967; PhD, Florida State University, 1970
Albrecht, John Ernest, Associate Professor of Animal Science. BS, Delaware Valley College, 1965; MS, 1968, PhD, 1971, North Carolina State University
Allen, Joe Frank, Professor of Chemistry. AB, Berry College, 1955; MS, University of Mississippi, 1959; PhD, Georgia Institute of Technology, 1963
Allen, Leonard Ray, Associate Professor of Agronomy and Soils. BS, Clemson University, 1952; MS, 1962, PhD, 1965, Auburn University
Allen, Robert Max, Head of Forestry Department: Professor of Forestry. BS, 1947, MS, 1951, Iowa State University; PhD, Duke University, 1958
Allen, William Harold, Associate Professor of Agricultural Engineering. BS, 1966, MS, 1969, Clemson University; PhD, University of Tennessee, 1972

*On leave.
Alley, Forrest Christopher, *Professor of Chemical Engineering*. BS, 1951, MS, 1956, Auburn University; PhD, University of North Carolina, 1962; PE.

Almala, Haren, *Visiting Assistant Professor of Electrical and Computer Engineering*. BTech, Indian Institute of Technology (India), 1970; PhD, Clemson University, 1979.

Alphin, John Gilbert, *Professor of Agricultural Engineering, Pee Dee Experiment Station*. BS, 1960, MS, 1962, PhD, 1965, North Carolina State University.


Anand, Subhash Chandra, *Professor of Civil Engineering*. BS, Banaras Hindu University (India), 1955; MS, 1965, PhD, 1968, Northwestern University; PE.

Anderson, Luther Perdee, *Dean, College of Agricultural Sciences: Professor of Agronomy and Soils*. BS, 1949, MS, 1962, Clemson University; PhD, University of Georgia, 1968.

Arbena, Joseph Luther, *Associate Professor of History*. AB, George Washington University, 1961; PhD, University of Virginia, 1970.


Arnold, Edwin Pratte, *Instructor in German*. BA, University of South Carolina, 1958; MA, Kent State University, 1968.

Arp, Earl Wade, Jr., *Associate Professor of Industrial Management*. BChE, Georgia Institute of Technology, 1964; MSEE, 1972, MBA, 1973, University of North Carolina.

Ashworth, Ralph Page, *Professor of Botany*. BS, Wake Forest University, 1939; MA, 1945, PhD, 1960, University of North Carolina.

Atchley, Bill Lee, *President of the University: Professor of Civil Engineering*. BS, 1957, MS, 1959, University of Missouri; PhD, Texas A&M University, 1965.

Aucin, Claire Russell, *Assistant Professor of Mathematical Sciences*. AB, Shorter College, 1951; MS, Auburn University, 1954.

Aucin, Clayton Verl, *Professor of Mathematical Sciences and Industrial Management*. University Marshal. BA, Louisiana College, 1951; MS, 1953, PhD, 1956, Auburn University; Post Doctorate, Stanford University, 1960-61.

Bailey, Roy Horton, Jr., *Associate Professor of Chemistry*. BS, 1948, PhD, 1958, University of North Carolina.

Baillie, Earle Eugene, *Adjunct Professor of Biochemistry: Lecturer in Medical Technology: Anderson Memorial Hospital*. BS, MD, University of Nebraska, 1967.


Baker, Donald Nelson, *Adjunct Professor of Agriculture*. BS, Pennsylvania State University, 1956; MS, 1959, PhD, 1962, Cornell University.


Balk, William Armstrong, *Associate Professor of Agricultural Engineering, Edisto Experiment Station*. BS, University of Georgia, 1948; MS, Clemson University, 1972.

Ballard, Robert Edward, *Assistant Professor of Botany*. BS, 1966, MA, 1968, Miami University; PhD, University of Iowa, 1975.


Barfield, Rayford Elliott, Jr., *Associate Professor of English*. AB, LaGrange College, 1961; MA, University of Georgia, 1963; PhD, University of Tennessee, 1969.

Barham, Barbara Chivvara, *Visiting Instructor in Nursing, Baccalaureate Degree Program*. BSN, Barry College, 1970; MS, Rutgers University, 1977.
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Barker, Robert Henry, J. E. Sirrine Professor of Textile Chemistry. BS, Clemson University. 1959; PhD, University of North Carolina. 1963

Barlage, William Berdell, Jr., Head of Chemical Engineering Department: Professor of Chemical Engineering. BS, Lehigh University, 1954; MChE, University of Virginia, 1955; PhD, North Carolina State University. 1960

Barnes, Michael Allen, Assistant Professor of Dairy Science. BS, 1966, MS, 1970, PhD. 1976, University of Connecticut

Barnett, Bobby Dale, Head of Poultry Science Department: Professor of Poultry Science. BS, 1950, MS, 1954. University of Arkansas; PhD, University of Wisconsin, 1957

Barnett, Ortus Webb, Jr., Professor of Microbiology, Plant Pathology and Physiology. BSA, 1961, MS, 1965. University of Arkansas: PhD, University of Wisconsin, 1968; Post Doctorate, Scottish Horticultural Institute, 1968-69

Barnett, William Jackson, Associate Professor of Electrical and Computer Engineering. BS, Clemson University, 1963; MS, Rutgers University, 1965; PhD, Clemson University, 1972

Barnhill, James Wallace, Assistant Professor of History. BA, Presbyterian College, 1947; MA, Northwestern University, 1949

Baron, William, Associate Professor of Civil Engineering. BSCE, City College of New York, 1960, MSCE, 1963. PhD, 1966. Purdue University; PE

Barth, Clyde Lewis, Professor of Agricultural Engineering. BS, University of Illinois, 1955; MS, 1961, PhD, 1971, University of Wisconsin

Bauer, Larry Lee, Professor of Agricultural Economics and Rural Sociology. BS, University of Illinois. 1961; MS, Purdue University, 1963; PhD, North Carolina State University, 1968

Bauld, Nelson Robert, Jr., Professor of Mechanical Engineering and Engineering Mechanics. BSME, 1958, MS, 1960. West Virginia University; PhD, University of Illinois. 1963: PE

Baumgardner, Reginald Andrew, Associate Professor of Horticulture. BS, Clemson University, 1957; MS, 1960, PhD, 1962. University of Maryland

Baxter, Ann Webster, Associate Professor of Microbiology. BA, Rockford College, 1938; MAT, 1964, PhD, 1967, University of North Carolina

Baxter, Luther Willis, Professor of Plant Pathology and Physiology. BS, Eastern Kentucky State College, 1950; MS, 1952, PhD, 1954. Louisiana State University

Beard, John Nelson, Jr., Associate Professor of Chemical Engineering. BS, University of South Carolina, 1958; MS, 1970, PhD, 1971, Louisiana State University

Becker, Laura Leff, Assistant Professor of History. BA, 1971, MA, 1972. Brown University; PhD, University of Pennsylvania, 1978

Beckwith, William Frederick, * Professor of Chemical Engineering. BS, 1957, MS, 1961, PhD, 1963, Iowa State University

Beheroy, Hassan Mohamed, Associate Professor of Textiles. BS, 1950, MS, 1955. Alexandria University: PhD, Manchester College of Science and Technology, 1959

Belcher, Cynthia Leahy, Assistant Professor of Nursing, Baccalaureate Degree Program. BSN, University of Miami. 1969; MN, Emory University, 1971

Bennett, John Everett, Associate Professor of Electrical and Computer Engineering. BSEE, 1958, MSEE, 1968, PhD, 1970. University of Tennessee

Benson, Robert Tidd, Professor of Vocational Education. BS, 1960, MS, 1963, Cornell University; EdD, Pennsylvania State University, 1968

Berger, Leonard, Associate Professor of Psychology. AB, 1968, MA, 1969, PhD, 1972, Temple University

Berry, Elizabeth Brunson, Associate District Extension Leader; Associate Professor of Home Economics. BS, Winthrop College, 1944

Beyerlein, Adolph Louis, Professor of Chemistry. BS, Fort Hays Kansas State College, 1960; PhD, University of Kansas, 1966

Birkhead, Paul Kenneth, Professor of Geology. AB, 1951, AM, 1960. University of Missouri: PhD, University of North Carolina. 1965

*On leave.
Birrenkott, Glenn Peter, Jr., Assistant Professor of Poultry Science. BS, 1973, MS, 1975, PhD, 1978, University of Wisconsin

Bishop, Carl Barnes, Associate Professor of Chemistry. BS, Clemson University, 1954; PhD, Michigan State University, 1959

Bishop, Eugene Harlan, Head of Mechanical Engineering Department; Professor of Mechanical Engineering. BS, Mississippi State University, 1955; PhD, University of Texas, 1964

Bishop, Muriel Boyd, Associate Professor of Chemistry; Coordinator of Medical Technology Program. BA, Huntingdon College, 1952; MS, Emory University, 1955; PhD, Michigan State University, 1958; Post Doctorate, Yale University, 1958-59

Bismack, Thaddeus Robert, Associate Professor of Accounting and Finance. BS, Central Michigan University, 1959; MBA, University of Michigan, 1960

Black, John Olar, Jr., Head of Seed Certification; Lecturer in Agronomy and Soils. BS, 1957, MS, 1961, Clemson University

Blackmon, Cyril Wells, Associate Professor of Plant Pathology and Physiology. Edisto Experiment Station. BS, Virginia Polytechnic Institute, 1949; MS, Trinity University, 1953; PhD, Texas A&M University, 1961

Blair, Dudley Wayne, Associate Professor of Economics. BS, 1970, PhD, 1975, Texas A&M University

Blanton, Lloyd Houston, Associate Professor of Agricultural Education. BS, 1961, MA, 1966. Clemson University; PhD, Ohio State University, 1970

Bodine, Ashby Burgess II, Assistant Professor of Dairy Science. BA, 1969, MS, 1975, PhD, 1978, Clemson University

Boettner, George Robert, Assistant Professor of Recreation and Park Administration. BS, 1965, MEd, 1966, East Carolina University

Boineau, John Pope, Adjunct Professor of Bioengineering. BS, University of South Carolina, 1955; MD, Duke University School of Medicine, 1959

Boland, Willard Robert, Professor of Mathematical Sciences. BS, Davidson College, 1959; MA, College of William and Mary, 1963; PhD, University of Colorado, 1968

Book, Norman Loyd, Professor of Building Science. BAE, 1955, MEng, 1967, PhD, 1973, Pennsylvania State University; AIA, PE

Bookmeyer, Beverly Brandon, Professor of Physics and Astronomy. AB, Chestnut Hill College, 1946; MS, 1961, PhD, 1964, University of Pennsylvania

Borgman, Robert Frederic, Professor of Food Science. DVM, 1947, MS, 1949, Michigan State University; PhD, Kansas State University, 1959

Bosdell, Francis Alvin, Associate Professor of Industrial Education. BS, 1949, MnEd, 1966, Clemson University

Bose, Anil Kumar, Associate Professor of Mathematical Sciences. BS, 1948, MS, 1956, Calcutta University; PhD, University of North Carolina, 1964

Box, Benton Holcomb, Dean, College of Forest and Recreation Resources; Professor of Forestry. BS, 1957, MF, 1959, Louisiana State University; DF, Duke University, 1967

Bradbury, Douglas Wilson, Alumni Professor of Mechanical Engineering. BME, Clemson University, 1940; MSE, University of Michigan, 1959; PE

Bradshaw, David Winstead, Assistant Professor of Horticulture. BS, 1968, MS, 1973, North Carolina State University; PhD, Virginia Polytechnic Institute and State University, 1977

Bragg, Charles Kenneth, Adjunct Professor of Textiles. BS, Wofford College, 1961; MS, Institute of Textile Technology (Virginia), 1963

Brainerd, Edwin Grenier, Jr., Assistant Professor of Psychology. BA, Washington College, 1968; MA, 1971, PhD, 1974, West Virginia University

Branan, James Richard, Assistant Professor of Mathematical Sciences. BS, 1973, MS, 1976, Utah State University; PhD, Rensselaer Polytechnic Institute, 1979

Brannock, Durant York, Jr., Assistant Professor of French. AB, Elon College, 1954; MA, Duke University, 1956
Brantley, Herbert. Associate Dean. College of Forest and Recreation Resources: Head of Recreation and Park Administration Department; Professor of Recreation and Park Administration. AB, 1956; MA, 1958; PhD, 1966. University of North Carolina


Briscoe, Ida Carolyn. Professor of Education. AB, LaGrange College, 1957; MEd, 1961; EdD, 1970. University of Georgia

Brittain, Jere Alonzo. Professor of Horticulture. Sandhill Experiment Station. BS, Clemson University, 1961; PhD, Virginia Polytechnic Institute and State University, 1967

Broadway, Michael William. Lecturer in Industrial Management. BS, Auburn University, 1974

Brock, Burt Victor. Professor of Physics and Microbiology. BS, Pennsylvania State University, 1956; PhD, Princeton University, 1965

Brooks, Alton DeWayne. Associate Professor of Education. BA, Carson-Newman College, 1963; MEd, Middle Tennessee State University, 1967; EdD, University of Georgia, 1972

Brown, Carolyn Scarry. Assistant Professor of Biochemistry. BA, Winthrop College, 1964; PhD, Vanderbilt University, 1969

Brown, Farrell Blenn. Associate Dean, Graduate Studies; Professor of Chemistry. BS, Lenoir-Rhyne College, 1957; MS, 1960, PhD, 1962. University of Tennessee; Post Doctorate, Texas A&M University, 1962-63

Brown, Lamarr Hamilton. Professor of Building Science. BArch, Auburn University, 1948

Brown, Russell Henry. Associate Professor of Civil Engineering and Engineering Mechanics. BS, University of Houston, 1966; PhD, Rice University, 1970

Brown, Susan Henrietta. Associate Professor of Industrial Management. BA, 1947; JD, 1950. University of Georgia; LLM, University of Pennsylvania, 1972

Brown, Susan Stuart. Assistant Professor of Sociology. BA, University of Richmond, 1973; MA, 1975, PhD, 1978. University of Tennessee


Brown, William Glynn, Jr. Professor of Animal Science. Sandhill Experiment Station. BS, University of Tennessee, 1953; MS, Oklahoma State University, 1958; PhD, University of Arkansas, 1973


Bryant, Hallman Bell. Associate Professor of English. BA, Emory University, 1959; MA, University of North Carolina, 1962; PhD, Vanderbilt University, 1967

Buchanan, Christine Hawkins. Visiting Instructor in Nursing. Baccalaureate Degree Program. BSN, Medical University of South Carolina, 1972; MN, University of South Carolina, 1978

Buckner, Sam Levi. Associate Professor of Education. BS, East Tennessee State University, 1960; MA, Appalachian State University, 1966; EdD, Auburn University, 1970

Bunn, Joe Millard. Professor of Agricultural Engineering. BS, 1955; MS, 1957. North Carolina State University; PhD, Iowa State University, 1960


Burch, Thomas Augustus. Assistant Professor of Agricultural Economics and Rural Sociology. BS, 1954. MS, 1955. University of Georgia

Burke, Thomas Edward. Associate Professor of Engineering. BS, Michigan State University, 1953; SM, Massachusetts Institute of Technology, 1955; PhD, University of Texas, 1969

*On leave.
Burkett, Byron Verner, Jr., Associate Professor of Industrial Education. BS, 1964; MME, 1965; Clemson University: PhD, University of South Carolina, 1976

Burley, Robert Hanna. Clinical Director of Physical Medicine. Lecturer in Nursing. BA, Vanderbilt University, 1948; MD, Medical University of South Carolina, 1952

Burnett, Wesley, Assistant Professor of Recreation and Park Administration. BA, Southern Methodist University, 1966; MSLS, Our Lady of the Lake University, 1970; MA, 1974; PhD, 1976, University of Oklahoma

Burrows, Peter Michael. Professor of Experimental Statistics. BSc, University of Manchester (England), 1960; PhD, North Carolina State University, 1971

Bursey, Robert Graham. Associate Professor of Food Science. BS, North Georgia College, 1966; MS, Medical College of Georgia, 1967; PhD, Clemson University, 1972

Burt, Philip Barnes. Professor of Physics. AB, 1956, MS, 1958; PhD, 1961, University of Tennessee

Burtnett, Frank Alan, Professor of Sociology. BA, MA, University of Texas, 1938; PhD, University of North Carolina, 1958

Bushing, Herbert William, Head of Civil Engineering Department; Professor of Civil Engineering. BA, BSCE, Valparaiso University, 1958; MSCE, 1963, PhD, 1967, Purdue University

Butler, John Harrison. Head of Music Department; Director of Bands; Professor of Music. BME, West Texas State University, 1955; MFA, 1960, EdD, 1968, University of Georgia

Butler, John Kendrick, Jr., Assistant Professor of Industrial Management. BS, Brown University, 1963; MBA, Michigan State University, 1970; DBA, Florida State University, 1977

Byerley, Neil Elmore, Lecturer in Accounting and Finance. BSBA, University of Tennessee, 1958; MA, University of Florida, 1971; CPA

Byrd, Wilbert Preston, Experiment Station Statistician; Professor of Experimental Statistics; Chairman, Experimental Statistics and Statistical Services. BS, 1949, MS, 1952, North Carolina State University; PhD, Iowa State University, 1955; Post Doctorate, Oregon State University, 1971

Bzdyl, Donald Gregory, Assistant Professor of English. BA, University of Miami, 1970; MA, 1971, PhD, 1977, University of Illinois

Caban, Jose Rafael, Associate Professor of Planning Studies. BArch, Clemson University, 1967; MCD, University of Liverpool (England), 1971; AIA, AIP

Caley, Paul Cochran. Professor of Industrial Education. BS, 1963, MA, 1964, PhD, 1969, Ohio State University

Calhoun, Richard James, Alumni Professor of English. BA, George Peabody College, 1948; MA, Johns Hopkins University, 1950; PhD, University of North Carolina, 1959; Post Doctorate, Duke University, 1964-65

Calvez, Daniel Jean, Instructor in French. License es Lettres, Angers University, 1965

Campbell, Becky Fields, Instructor in Nursing. Baccalaureate Degree Program. BS, 1974, MSN, 1977, Clemson University

Campbell, William Warren, Instructor in Music; Director of Choral Activities. BM, Texas Wesleyan College, 1966; MM, Southern Methodist University, 1970

Camper, Nyal Dwight, Professor of Plant Pathology and Physiology and of Botany. BS, 1962, PhD, 1966, North Carolina State University

Cantrell, Harley Furman, Adjunct Associate Professor of Microbiology; Lecturer in Medical Technology, School of Medical Technology, Greenville General Hospital; Clinical Microbiologist. BS, Furman University, 1961; MS, University of North Carolina, 1965; PhD, Clemson University, 1968; Post Doctorate, 1968-69; MT (ASCP); Mi (ASCP)

Cantrell, Rayford Stephen, Assistant Professor of Industrial Management. BS, University of Alabama, 1972; MS, University of Kentucky, 1974

Card, Edith Bryson, Assistant Professor of Music. AB, Furman University, 1944; MME, 1957, PhD, 1975, Florida State University

Carew, Glen Stratton, Assistant Professor of Accounting and Finance. BS, Piedmont College, 1968; MAcct, University of Georgia, 1970; CPA
Carmack, Veronica Deloria, Associate Professor of Home Economics. BS, University of Kentucky, 1965; MS, University of Tennessee, 1969
Carner, Gerald Roy, Professor of Entomology and Economic Zoology. BA, Asbury College, 1964; MS, 1966, PhD, 1969, Auburn University
Carnevale, Thomas Anthony, Visiting Professor of Mathematical Sciences. BS, St. Francis College, 1964; MS, Fordham University, 1968; DA, Idaho State University, 1976
Carney, Elizabeth Donnelly, Assistant Professor of History. BA, Smith College, 1969: MA, 1973, PhD, 1975, Duke University
Carpenter, Earl Thomas, Head of Agricultural Education Department: Professor of Agricultural Education. BS, 1948, MEd, 1954, EdD, 1960, University of Missouri
Carrillo, Loretta, Assistant Professor of English. BA, St. Mary's University (Texas), 1972; MA, 1974, PhD, 1979, Michigan State University
Carroll, June Langley, Associate District Extension Leader: Associate Professor of Home Economics. BS. Winthrop College, 1954
Carter, George Emitt, Jr., Associate Professor of Plant Pathology and Physiology. BS, 1968, MS, 1970, Wake Forest University; PhD, Clemson University, 1973
Caskey, Claire Omar, Associate Professor of English. BS, Appalachian State University, 1947; MA, Duke University, 1948
Castro, Walter Ernest, Professor of Mechanical Engineering and Engineering Mechanics. BS, Indiana Institute of Technology, 1959; MS, Clemson University, 1962; PhD, University of West Virginia, 1965; PE
Cathey, Silvia Gilbert, Instructor in Electrical and Computer Engineering. BS, 1975, MS, 1976, Clemson University
Cauley, Lanier Steward, Visiting Assistant Professor of Mechanical Engineering. BS, 1961, MS, 1968, Virginia Polytechnic Institute and State University; PhD, Clemson University, 1975
Cely, Marvin Singleton, Jr., District Extension Leader: Associate Professor of Horticulture. BS, 1957, 1970, Clemson University
Chapin, Jay Willard, Assistant Professor of Entomology and Economic Zoology. BS, Dickinson College, 1970; MA, East Carolina University, 1975; PhD, Clemson University, 1978
Chaplin, Robert Lee, Jr., Professor of Physics. BS, Clemson University, 1948; MS, 1953, PhD, 1962, North Carolina State University
Chapman, Stephen Richard, Associate Dean. Director of Instruction. College of Agricultural Sciences: Professor of Agronomy and Soils. BS, 1959, MS, 1963, PhD, 1966, University of California (Davis)
Chen, Thomas Chung-Shan, Visiting Instructor in Chemistry. BA, National Cheng-Kung University, 1961; MS, 1970, PhD, 1975, University of Alabama
Chisman, James Allen, Acting Head of Engineering Technology Department: Professor of Engineering Technology and Systems Engineering. BS, University of Akron, 1958; MS, 1960, PhD, 1963, University of Iowa; PE
Chodil, Judith Joyce, Director of Continuing Education in Nursing: Associate Professor of Nursing. BSN, University of Illinois, 1968; MA, 1972, PhD, 1978, New York University
Cholewinski, Frank Michael, Professor of Mathematical Sciences. EP, 1958, MS, 1959, Auburn University; PhD, Washington University, 1964
Christenbury, Gerald Davis, Associate Professor of Agricultural Engineering. Pee Dee Experiment Station. BS, North Carolina State University, 1964; MS, Clemson University, 1966; PhD, Iowa State University, 1975
Christie, Deidra Van Laningham, Visiting Instructor in Economics. BA, Huntingdon College, 1966; MA, Ball State University, 1972
Clark, Helen Marie, Assistant Professor of Sociology. BS, 1951, MS, 1955, University of Utah; PhD, Emory University, 1973
Clark, James Edwin, Associate Professor of Civil Engineering. BSCE, 1957, MS, 1964, University of South Carolina; PhD, North Carolina State University, 1967; PE
Clark, Lawrence Stanley, Assistant Professor of Accounting and Finance. BBA, Augusta College, 1968; MAccpt, University of Georgia, 1970: CPA; CMA
Clark, Matthew Aitken,* Associate Professor of Planning Studies. MA, DRIBA, University of Leicester (England), 1967; GradDiplPI, Architectural Association (London), 1970; AIP
Cline, Mickey Ray, Visiting Instructor in Political Science. BA, 1961, MA, 1966, University of South Carolina
Clinkscales, William Cherry,* State 4-H and Youth Development Coordinator; Assistant Professor of Agricultural Education. BS, South Carolina State College, 1965; MS, Clemson University, 1974
Clugston, James Paul, Adjunct Associate Professor of Entomology and Economic Zoology. BS, 1958, MS, 1959, Pennsylvania State University; PhD, University of Georgia, 1973
Cody, Jack Benjamin, Associate Professor of Forestry. BS, 1954, MF, 1963, University of Michigan
Coffeen, William Weber, Professor of Ceramic Engineering. BS, 1935, MS, 1937, University of Illinois; PhD, Rutgers University, 1969
Colacino, James Michael, Assistant Professor of Zoology. BA, St. John Fisher College, 1968; MA, 1970, PhD, 1973. State University of New York (Buffalo)
Cole, Spurgeon Nothern, Associate Professor of Psychology. AB, 1960, MS, 1965, PhD, 1966, University of Georgia
Collier, John Anton, Assistant Professor of Agricultural Engineering, BA, Georgia Institute of Technology, 1970; MS, University of Georgia, 1972; PhD, Clemson University, 1978; PE
Collins, Donald Lynn, Professor of Architecture. BLA, North Carolina State University, 1968; MLA, Harvard University, 1969; ASLA
Collins, Jackie Lee, Lecturer in Medical Technology, Self Memorial Hospital. BS, Marshall University, 1964; MD, West Virginia University School of Medicine, 1967
Collins, Thomas Frank, Associate Professor of Physics and Astronomy. AB, Mercer University, 1956; MS, Clemson University, 1958
Connor, Anthony Cooper, Lecturer in Computer Science. BS, 1957, MA, 1964, Temple University
Conover, Richard Allan, Jr., Associate Professor of Recreation and Park Administration. BA, University of Michigan, 1953; MA, University of Wisconsin, 1968; PhD, Colorado State University, 1974
Cook, Bruce Farrell, Assistant Director of Bands; Associate Professor of Music. BME, 1954, MA, 1965, West Texas State University; DMA, University of Texas, 1975
Cook, Wilton Pierce, Associate Professor of Horticulture. BS, Clemson University, 1962; MS, University of Florida, 1964
Cooke, Francis Walter, Head of Interdisciplinary Studies Department; Professor of Bioengineering and Materials Engineering. BS, Notre Dame University, 1957; PhD, Rensselaer Polytechnic Institute, 1966
Cool, Bingham Mercur, Professor of Forestry. BS, Louisiana State University, 1940; MS, Iowa State University, 1941; PhD, Michigan State University, 1957
Coolidge, Harold Norman, Jr., Alumni Professor of Architectural History. BS, 1944, BArch, 1950, Harvard University; MA, 1957, PhD, 1964, University of Pennsylvania
Copeland, Jimmy Bryant, Associate Director of Cooperative Extension Service; Professor of Agricultural Economics and Rural Sociology. BSA, University of Georgia, 1948; MS, Clemson University, 1958; PhD, University of Wisconsin, 1966
Cordell, Harold Kenneth, Adjunct Associate Professor of Forest and Recreation Resources. BSF, 1966, MF, 1967, PhD, 1975, North Carolina State University
Corder, William Owens, Professor of Education. BA, University of South Carolina, 1947; MS, Clemson University, 1957; EdS, Peabody College, 1965; EdD, University of Virginia, 1969
Coston, Donald Claude, Assistant Professor of Horticulture. BS, North Carolina State University, 1972; MS, 1974, PhD, 1976, Michigan State University
Cotter, Helen Theresa, Associate Professor of Nursing. Baccalaureate Program. BS, Carroll College, 1953; MS, 1961, PhD, 1968, Catholic University of America

*On leave.
Faculty 313

Cottle, Rex Lee, Head of Economics Department; Associate Professor of Economics. BS. Weber State College. 1970; PhD, Texas A&M University, 1974

Couch, James Houston, Visiting Associate Professor of Engineering Technology. BS, 1941, MS, 1954, Clemson University.

Coulter, Edwin Martin, Associate Professor of Political Science. BA, Furman University, 1962; PhD, University of Virginia, 1965

Cover, Alan Seymour, Associate Professor of Mathematical Sciences. BS, Indiana State University, 1954; MA, 1960, PhD, 1964, Pennsylvania State University

Cox, Eugene Cary, Lecturer in Medical Technology; Co-director, School of Medical Technology, Greenville General Hospital. BS, Furman University, 1954; MD, Medical University of South Carolina, 1958

Cox, Headley Morris, Dean, College of Liberal Arts; Professor of English. AB, 1937, MA, 1939, Duke University; PhD, University of Pennsylvania, 1958

Crockett, Garnet Roy, Head of Agronomy and Soils Department; Professor of Agronomy and Soils. BS, Virginia Polytechnic Institute, 1952; PhD, University of Wisconsin, 1955

Crader, Kelly Wayne, Associate Professor of Sociology. BS, MS, 1968, Illinois State University; PhD, Emory University, 1971

Craig, James Telford, Associate Professor of Agricultural Engineering. BS, Clemson University, 1951; MS, University of Georgia, 1960

Crawford, Margaree Seawright, Assistant Professor of Education. BS, South Carolina State College, 1963; MEd, Clemson University, 1973; EdD, University of Massachusetts, 1976

Cross, Dee Lewis, Associate Professor of Animal Science. BS, Austin Peay State University, 1968; MS, 1971, PhD, 1973, University of Kentucky

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Skelley, George Calvin, Jr., Professor of Animal Science. BS, Oklahoma Panhandle State College, 1958; MS, 1960. PhD, 1963, University of Kentucky

Skelton, Billy Ray, Professor of Economics. BS, 1956, MS, 1958, Clemson University; PhD, Duke University, 1964

Skelton, Bobby Joe, Professor of Horticulture. BS, 1957, MS, 1960, Clemson University; PhD, Virginia Polytechnic Institute, 1966

Skelton, Thomas Eugene, Professor of Entomology and Economic Zoology. BS, 1953, MS, 1956, Clemson University; PhD, University of Georgia, 1969

Skipper, Horace Dean, Professor of Agronomy and Soils. BS, North Carolina State University, 1964; MS, 1967, PhD, 1969, Oregon State University

Skove, Malcolm John, Alumni Professor of Physics. BS, Clemson University, 1956; PhD, University of Virginia, 1960

Slann, Martin Wayne, Associate Professor of Political Science. AB, University of Miami, 1964; MA, University of Connecticut, 1966; PhD, University of Georgia, 1970

Sloan, Don Rex, Assistant Professor of Poultry Science. BSA, University of Arkansas, 1967; PhD, University of Florida, 1976

Smith, Benjamin Landis, Assistant Professor of Industrial Education. BS, Florida State University, 1966: MEd, Clemson University, 1972

Smith, Bill Ross, Associate Professor of Agronomy and Soils. BS, Texas Tech University, 1964; MS, University of Arizona, 1966; PhD, North Carolina State University, 1970

Smith, Chester Roland, Professor of Industrial Management. BS, University of Alabama, 1941; MA, 1947, PhD, 1950, University of Virginia

Smith, Daniel Bruce, Professor of Agricultural Economics and Rural Sociology. BS, Auburn University, 1963; MS, University of Tennessee, 1965; PhD, University of Kentucky, 1973

Smith, David Cannon, Instructor in Entomology and Economic Zoology. BS, 1971, MS, 1974, Clemson University

Smith, Earl Bruce, Lecturer in Medical Technology, Greenville Memorial Hospital. BS, 1965, PhD, 1972, University of Georgia

Smith, Fred Harrison, Professor of Plant Pathology and Physiology. BSA, 1951, MSA, 1952, PhD, 1970, University of Georgia

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Snell, Georgia Ann, Assistant Professor of Nursing, Baccalaureate Degree Program. BSNEd, University of Georgia, 1951; MSN, Catholic University of America, 1954

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Steirer, William Frank, Jr., Associate Professor of History. BA, Gettysburg College, 1959; MA, 1962, PhD, 1972, University of Pennsylvania
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Stillwell, Ephraim Posey, Jr., Professor of Physics. BS, Wake Forest University, 1956; MS, 1958, PhD, 1960, University of Virginia
Stockham, James Allen, Assistant Professor of Visual Arts. BFA, 1970, MFA, 1973, Wayne State University
Stone, Louis Howard, Assistant Professor of Industrial Management. BS, North Carolina State University, 1961; MBA, University of North Carolina, 1962
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Stutenberger, Fred John, Professor of Microbiology. BS, Bellarmine-Ursuline College, 1962; MS, University of Houston, 1964; PhD, Michigan State University, 1967
Sullivan, John Russell, Associate Professor of Mathematical Sciences. AB, 1939, MA, 1949, Georgetown University
Sullivan, Michael Jack, Associate Professor of Entomology and Economic Zoology. Edisto Experiment Station. BS, Texas Tech University, 1967; MS, 1971, PhD, 1973, North Carolina State University
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Sutton, Russell Wayne, Associate Professor of Agricultural Economics and Rural Sociology. BS, 1963, MS, 1967, PhD, 1974, University of Kentucky
Swanson, David Mitchell, Associate Professor of Industrial Management. BS, University of North Carolina, 1966; MA, University of Chicago, 1969; PhD, University of North Carolina, 1972

Sweeney, John Robert, Assistant Professor of Entomology and Economic Zoology. BS, 1967, MS, 1971, University of Georgia; PhD, Colorado State University, 1975

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Tanner, Gloria Ann, Director of Nursing Research; Associate Professor of Nursing, Baccalaureate Degree Program. BSN, Mount Saint Agnes College, 1956; MSN, University of Maryland, 1964; EdD, Columbia University Teachers College, 1974

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Taylor, Julia Baskin, Professor of Home Economics. BS, Winthrop College, 1936; MS, University of Tennessee, 1951

Taylor, Mary Beverley, Assistant Professor of Horticulture. BA, Sweet Briar College, 1973; MLA, North Carolina State University, 1978

Taylor, Robert Joe, Associate Professor of Zoology. BA, Stanford University, 1967; MA, 1970, PhD, 1972, University of California (Santa Barbara)

Taylor, Theodore David, Associate Professor of Ceramic Engineering. BS, Alfred University, 1963; MS, 1966, PhD, 1971, Pennsylvania State University

Tennant, Herbert Milton, Jr., Instructor in Home Economics. BS, David Lipscomb College, 1973; MS, Clemson University, 1976

Tergilafera, Gloria Williamson, Visiting Instructor in Food Science. BS, Northeast Louisiana University, 1974; MS, Louisiana Tech University, 1976

Thacher, John Edmund, Visiting Instructor in Animal Science. BA, 1971, MS, 1974, University of Wisconsin

Thames, Brenda Jumper, Lecturer in Home Economics. BS, Mississippi State University, 1976

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Thomas, Henry Albert, Lecturer in Recreation and Park Administration. BS, High Point College, 1975; MS, University of North Carolina, 1978

Thompson, Carl Eugene, Associate Professor of Animal Science. BS, 1963, MS, 1968, Pennsylvania State University; PhD, Virginia Polytechnic Institute and State University, 1971

Thompson, Carl Stassen, Associate Professor of Agricultural Economics and Rural Sociology. BS, MS, 1968, Murray State University; PhD, University of Kentucky, 1973

Thompson, Raymond George, Assistant Professor of Materials Engineering. BSE, 1974, MSE, 1975, University of Alabama; PhD, Vanderbilt University, 1979

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Waddle, Gerald Lee, Associate Professor of Industrial Management. BA, Baldwin-Wallace College, 1965; MBA, Kent State University, 1968; PhD, University of South Carolina, 1973
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Wagner, Donald Finch, Associate Professor of Horticulture. BS, 1963, MS, 1965, PhD, 1968, Iowa State University
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Wallenius, Marcia Rae, Lecturer in Recreation and Park Administration. BA, San Jose State University, 1962; MRPA, Clemson University, 1978
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Wannamaker, John Murray, Professor of Accounting and Finance. BS, 1950, MS, 1960, University of South Carolina; PhD, Louisiana State University, 1966; CPA, CMA
Wannamaker, Patricia Walker, Associate Professor of German. AB, 1950, MA, 1958, University of South Carolina; PhD, Louisiana State University, 1964
Warner, Daniel Douglas, Associate Professor of Mathematical Sciences. BS, 1965, MA, 1966, Arizona State University; PhD, University of California (San Diego), 1974
Warner, John Robinson, Professor of Forestry. BS, 1946, MF, 1949, DF, 1953, Duke University
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Watson, Katherine Ramsey, *Instructor in Mathematical Sciences*. BA, William and Mary College, 1938; MMath, University of South Carolina, 1965

Webb, Byron Kenneth, *Head of Agricultural Engineering Department; Professor of Agricultural Engineering*. BS, 1955; MS, 1962, Clemson University; PhD, North Carolina State University, 1966; PE

Webb, Hugh Weyman, *Associate Professor of Building Science*. BCE, Clemson University, 1941; MS, Stanford University, 1957; ASCE: NSPE

Webb, Lloyd George, *Associate Professor of Entomology and Economic Zoology*. BS, University of Georgia, 1938; MS, Auburn University, 1941; PhD, Ohio State University, 1949

Webster, Henry Wise, *Professor of Animal Science*. BS, 1960, MS, 1974, North Carolina State University; PhD, Clemson University, 1976

Welch, Annie Stokes, *Instructor in Nursing, Associate Degree Program*. BSN, University of South Carolina, 1968; MSN, Clemson University, 1978

Wells, Gary James, *Assistant Professor of Agricultural Economics and Rural Sociology*. BA, University of North Carolina (Asheville), 1973; ME, 1974; PhD, 1977, North Carolina State University

Welter, John Finlay, *Associate Professor of Poultry Science*. BS, 1951, MS, 1964, Clemson University

Wentworth, William Martin, *Assistant Professor of Sociology*. BA, Indiana University, 1972; MA, University of Maryland, 1974; PhD, University of Virginia, 1978

West, William Elmer, *Professor of Industrial Education*. BS, Ohio University, 1958; MA, 1964, PhD, 1969, Ohio State University

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Wheeler, Alan Dexter, *Instructor in Industrial Management*. BBA, University of Massachusetts, 1950; MBA, West Texas State University, 1969

Wheeler, Alfred Portius, *Assistant Professor of Zoology*. BS, Butler University, 1969; PhD, Duke University, 1975

Wheeler, Richard Ferman, *Head of Animal Science Department; Professor of Animal Science*. BS, 1941, 1947, Clemson University; MS, Mississippi State University, 1949; PhD, University of Illinois, 1954

White, Charlie Raymond, Jr., *Associate Professor of Recreation and Park Administration*. BS, North Carolina State University, 1966; MS, Indiana University, 1967


White, Mervin Forrest, *Associate Professor of Sociology*. BS, 1962; MS, 1965, Brigham Young University; PhD, University of Kentucky, 1971

Whitehurst, Clinton Howard, Jr., *Professor of Industrial Management*. BS, 1957, MA, 1958, Florida State University; PhD, University of Virginia, 1962; Post Doctorate, Edinburgh University, 1970

Whitman, Sallie Vinson, *Instructor in Nursing, Associate Degree Program*. BSN, Armstrong State College, 1978; MSN, Medical College of Georgia, 1979

Whitmire, Jerry Morris, *Assistant Professor of Spanish*. BA, University of North Carolina, 1963; MA, University of Alabama, 1966

Whitten, William Clyde, Jr., *Professor of Economics*. BS, Clemson University, 1947; MS, Georgia Institute of Technology, 1950; PhD, University of Alabama, 1964

Wickiffe, Louise Waldrop, *Instructor in Nursing, Baccalaureate Degree Program*. BSN, University of South Carolina, 1975; MSN, Medical College of Georgia, 1978

Wiggins, Charles Donald, *Associate Professor of Accounting and Finance*. BBA, 1972, MBA, 1973, Georgia Southern College; DBA, Louisiana Tech University, 1976

Wiggins, Emily Sutherland, *Assistant Professor of Home Economics*. BS, 1959, MAT, 1969, Winthrop College

Wilcox, Lyle Chester, *Dean, College of Engineering; Professor of Electrical and Computer Engineering*. BSEE, Tri-State College, 1954; MSEE, 1958, PhDEE, 1963, Michigan State University
Wilhite, Mary Jean, Director of Baccalaureate Degree Program in Nursing; Associate Professor of Nursing. BSN. Baylor University, 1958; MSN. Washington University (St. Louis), 1968; EdD. University of Tulsa, 1975

Willey, Edward Parker, Associate Professor of English. AB, 1955, MA, 1957, PhD, 1968, University of North Carolina

Williams, John Newton II, Professor of Animal Science. BS, Alabama Polytechnic Institute, 1950; MS, Mississippi State University, 1961; PhD, University of Tennessee, 1965

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Willingham, Russell, Instructor in French. BA, Clark College, 1963; MA, Atlanta University, 1967

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Wilson, Patricia Ann, Visiting Assistant Professor of Vocational Education. BA, 1974, MS, 1976, Illinois State University

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Wise, Michael Louis, Assistant Professor of Agricultural Economics and Rural Sociology. BS, Mississippi State University, 1969; PhD, Washington State University, 1977

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Wolla, Maurice LeRoy, Professor of Electrical and Computer Engineering. BS, North Dakota State University, 1950; PhD, Michigan State University, 1966

Womer, Norman Keith, Associate Professor of Industrial Management. BA, Miami University, 1966; PhD, Pennsylvania State University, 1970

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Woodell, Charles Harold, Associate Professor of English. BA, 1963, MA, 1964, Wake Forest University; PhD, University of North Carolina, 1974

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Woodson, Marvin Clarence, Jr., *Associate Professor of Education.* BS, Furman University, 1961; MAT, Converse College, 1964; PhD, University of South Carolina, 1976

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Yang, Tah-Teh. *Professor of Mechanical Engineering.* BS, Shanghai Institute of Technology, 1948; MS, Oklahoma State University, 1957; PhD, Cornell University, 1961

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Yazar, Mazhar Ahmet. *Visiting Assistant Professor of Chemical Engineering.* BS, Robert College (Turkey), 1970; MS, 1973, PhD, 1976, Clemson University

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Zimmerman, James Kenneth. *Associate Professor of Biochemistry.* BS. University of Nebraska, 1965. PhD, Northwestern University, 1969

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**EMERITI FACULTY**

Adams, Hewitt Dayne, BS, MA. *Assistant Professor Emeritus of History*

Albert, Willard Benjamin, BS, MS, PhD, *Associate Professor Emeritus of Botany and Bacteriology*

Armstrong, George Miller, BS, MA, PhD, *Head Emeritus of Botany and Bacteriology Department; Professor Emeritus of Botany and Bacteriology; Plant Pathologist Emeritus*

Arndt, Charles Homer, AB, MS, PhD. *Plant Pathologist Emeritus*

Aull, George Hubert, BS, MS, PhD, *Head Emeritus of Agricultural Economics and Rural Sociology Department; Professor Emeritus of Agricultural Economics and Rural Sociology; Agricultural Economist Emeritus*

Baker, George Homer, BS, *State Coordinator Emeritus of 4-H and Youth Development Programs; Assistant Professor Emeritus of Agronomy and Soils*

*On leave.*
Banister, Robert Allen, BS, MS, Director Emeritus of Cooperative Education; Associate Professor Emeritus of Engineering Graphics
Barker, William Jefferson, BS, Associate Professor Emeritus of Forestry
Bauknight, Lehman M., Jr., BS, MS, Professor Emeritus of Agricultural Economics and Rural Sociology
Benton, Don Alwin, BS, Associate Professor Emeritus of Agronomy and Soils
Biérr, Bert W., DVM, Professor Emeritus of Poultry Science
Bolen, Claude Waldron, AB, MA, PhD, Professor Emeritus of History
Boone, Merritt Anderson, BS, MS, PhD, Professor Emeritus of Poultry Science
Bowen, William Clayton, BS, MS, Associate Professor Emeritus of Agricultural Education
Brandt, Graydon William, BS, MS, PhD, Associate Professor Emeritus of Dairy Science
Branon, Carroll Cleveland, BS, Associate Professor Emeritus of Dairy Science
Brown, Hugh Monroe, BA, MA, PhD, Dean Emeritus, School of Textiles
Bruner, Marlin Harner, BS, MF, Associate Professor Emeritus of Forestry; Forest Manager Emeritus, The Clemson Forest
Buchanan, Patricia Hill, AB, AM, PhD, Professor Emerita of History
Campbell, Thomas Alexander, Jr., BS, ME, Head Emeritus of Textile Department, Professor Emeritus of Textiles
Cato, Lewis Felton, BS, MS, Associate Professor Emeritus of Animal Science
Coker, Edward Caleb, Jr., BS, MA, Associate Professor Emeritus of Mathematical Sciences
Cooper, Herbert Press, BS, MS, PhD, Dean Emeritus, School of Agriculture; Director Emeritus of South Carolina Agricultural Experiment Station; Professor Emeritus of Agronomy; Agronomist Emeritus

Cooper, James Bronauga, BS, MS, Associate Professor Emeritus of Poultry Science
Couch, James Houston, BS, MS, Associate Professor Emeritus of Engineering Technology
Craven, Ruby Mae, BS, MS, PhD, State Leader Emerita of Extension Home Economics Programs; Professor Emerita of Home Economics
Dean, Jordan Arthur, BA, MA, Associate Professor Emeritus of Modern Languages
Dunkle, Bernard Edward, BS, MS, Associate Professor Emeritus of Engineering Graphics
Epps, William Monroe, BS, PhD, State Pathologist Emeritus; Head Emeritus of Plant Pathology and Physiology Department; Professor Emeritus of Plant Pathology and Physiology
Fear, Arthur J., BA, MA, PhD, Professor Emeritus of Speech
Felder, Herman McDonald, Jr., AB, MA, Associate Professor Emeritus of English
Ferree, Roy James, BS, MS, Associate Professor Emeritus of Horticulture
Foster, Harold Homer, AB, MA, PhD, Associate Professor Emeritus of Botany and Bacteriology
Fulmer, Louise Gray, AB, Instructor Emerita in Mathematical Sciences
Gage, Gaston, BS, MEd, Dean Emeritus of the School of Industrial Management and Textile Science; Head Emeritus of Yarn Manufacturing Department; Professor Emeritus of Carding and Spinning
Garrison, Olen Brantford, BS, MS, PhD, Director Emeritus of Agricultural Experiment Station; Director Emeritus of Research in Agriculture; Professor Emeritus of Horticulture
Goebel, Norbert Bernard, BS, MF, Associate Professor Emeritus of Forestry
Goodin, Curtis Paul, BS, MS, Associate Professor Emeritus of Electrical and Computer Engineering
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Huff, Lorenz Ditmar, AB, MS, PhD, Head Emeritus of Physics Department; Professor Emeritus of Physics
Hughes, Morris Burdette, BS, PhD, Professor Emeritus of Horticulture, Edisto Experiment Station
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King, Willis Alonzo, BS, MS, PhD, Head Emeritus of Dairy Science Department; Professor Emeritus of Dairy Science
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Trively, Ilo Alley, BS, MS, PE, Professor Emeritus of Civil Engineering
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Van Blairicom, Lester Oscar, BS, MS, Professor Emeritus of Horticulture
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Williamson, Paul Silas, BS, MS, Associate Professor Emeritus of Agricultural Economics and Rural Sociology
Williams, John Boyce, BS, State 4-H and Youth Development Coordinator Emeritus; Assistant Professor Emeritus of Agricultural Education

Williford, Cynthia Williams, BS, MS, Assistant to State Leader Emerita of Extension Home Economics Program; Assistant Professor Emerita of Home Economics

Wilson, Milner Bradley, Jr., AB, AM, Associate Professor Emeritus of English

Winter, James Paul, AB, MA, Associate Professor Emeritus of English

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Zink, William Talbott, Jr., BS, MSEE, Associate Professor Emeritus of Electrical and Computer Engineering

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EDUCATIONAL COUNCIL

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PLANNING COUNCIL

UNDERGRADUATE COUNCIL

ALTERNATES

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J. Stuart Land, '40, Abbeville, South Carolina, District 3
Wellington M. Manning, Jr., '58, Spartanburg, South Carolina, District 4

Goodwin G. Thomas, '42, Rock Hill, South Carolina, District 5
A. Harrison McLaurin, '51, Irmo, South Carolina, District 6
Thomas C. Moss, '43, Cameron, South Carolina, District 7
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Byron B. Harder, MD, Physician  
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John C. Cureton, Manager
The College of Education offered off-campus courses through the Office of Educational Services for school districts and other agencies in South Carolina. The following is an official record of the courses offered from the spring semester through the fall semester 1979.

<table>
<thead>
<tr>
<th>College</th>
<th>Semester</th>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ABBEVILLE</td>
<td>Spring</td>
<td>Ed 763</td>
<td>Middle School Reading</td>
</tr>
<tr>
<td>ANDERSON</td>
<td>Summer</td>
<td>Ed 410, 610</td>
<td>Advanced Arts and Crafts*</td>
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<tr>
<td>Fall</td>
<td>Ed 434, 634</td>
<td>Ed 763</td>
<td>Mainstreaming the Handicapped*</td>
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<tr>
<td></td>
<td>In Ed 410, 610</td>
<td>Middle School Reading</td>
<td></td>
</tr>
<tr>
<td>BEAUFORT</td>
<td>Spring</td>
<td>Ed 410, 610</td>
<td>The Learning Process for Teachers*</td>
</tr>
</tbody>
</table>

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# Public Service Activity

## BELTON-HONEA PATH

<table>
<thead>
<tr>
<th>Season</th>
<th>Course</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Spring</td>
<td>Ed 461, 661</td>
<td>Teaching Reading in the Elementary School</td>
</tr>
<tr>
<td>Fall</td>
<td>Ed 694</td>
<td>School and Community Relationships</td>
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## CLINTON

<table>
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<th>Season</th>
<th>Course</th>
<th>Description</th>
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<tbody>
<tr>
<td>Summer</td>
<td>Econ 750</td>
<td>Economic Concepts and Classroom Application for Teachers</td>
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## COLUMBIA

<table>
<thead>
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<th>Season</th>
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<tbody>
<tr>
<td>Spring</td>
<td>Ag Ed 736</td>
<td>Internship: Teaching</td>
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<tr>
<td>Summer</td>
<td>In Ed 610</td>
<td>Vocational Teacher Education*</td>
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<tr>
<td>Fall</td>
<td>In Ed 310</td>
<td>Methods of Trade Teaching</td>
</tr>
<tr>
<td></td>
<td>In Ed 410, 610</td>
<td>Individualizing Instruction in Vocational Education*</td>
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## DUE WEST

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<th>Season</th>
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<tr>
<td>Spring</td>
<td>Ed 802</td>
<td>Human Development: Psychology of Learning</td>
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## EDGEFIELD

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<td>Spring</td>
<td>In Ed 410, 610</td>
<td>The Learning Process for Teachers*</td>
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## FLORENCE

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<th>Season</th>
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<tr>
<td>Spring</td>
<td>In Ed 410, 610</td>
<td>Test Construction and Evaluation*</td>
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<tr>
<td>Summer</td>
<td>Ag Ed 726</td>
<td>Agricultural Mechanization for Inservice Teachers</td>
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<tr>
<td>Fall</td>
<td>In Ed 410, 610</td>
<td>Shop Organization and Management*</td>
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## GREENVILLE

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<th>Season</th>
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<tbody>
<tr>
<td>Spring</td>
<td>Econ 751</td>
<td>Current Issues in Economics for Teachers</td>
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<tr>
<td></td>
<td>Ed 435, 635</td>
<td>Middle School Organization and Curriculum*</td>
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<tr>
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<td>Ed 462, 662</td>
<td>Reading Diagnosis and Remediation</td>
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<td>Ed 469, 669</td>
<td>Characteristics of Children with Emotional Handicaps</td>
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<tr>
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<td>Ed 494, 694</td>
<td>School and Community Relationships</td>
</tr>
<tr>
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## GREENWOOD

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**LANCASTER**

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**PICKENS**

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**WOFFORD COLLEGE**

| Summer | Engl 603 | Composition for Teachers |

*Special Institute course organized according to need.*
GRADUATES OF 1979
ASSOCIATE AND BACHELORS' DEGREES CONFERRED MAY 11, 1979

COLLEGE OF AGRICULTURAL SCIENCES
LUTHER PERDEE ANDERSON, Dean
BACHELOR OF SCIENCE

Agricultural Economics
Dartlin Richard Alsmeyer .......... Potomac, Md.
**Elizabeth Jean Atwood Deeg .......... Easley
Harry Bailey DuRant .......... Gable
William Butler Ferguson .......... Clinton
James Walter Kehoe III .......... Miami, Fla.
Karen Lane McCain .......... Lancaster
George William Simmons .......... Greenwood
Martha Jane Smith .......... Mt. Pleasant
*Bennett Charles Stephens .......... Dillon
George Ray Warner .......... Greenwood
William Franklin Webb .......... Saluda

Agricultural Mechanization and Business
*Thomas Lee Arthur .......... Spartanburg
Charles William Davis, Jr. .......... Pickens
Stephen David Fulton .......... Denmark
Charles Alfred Hallman, Jr. .......... Demorest
*Alva Laverne McCaskill III .......... Bishopville
*Don Raemon McDaniel, Jr. .......... Bishopville

Animal Industries
John Marion Barnes .......... Ehrhardt
*Don Elliott Batson .......... Marietta
Regina Reilley Burke .......... Sumter
Christopher James Carter .......... West Columbia
Larry Keith Collins .......... Landrum
Michael Keith Cordray .......... Ravenel
Rome McMillan Davis .......... Denmark
†**Leslie McCullough Edwards .......... Spartanburg
Cheryl Lynn Evans .......... Sumter
Evelyn Josephine Garren .......... Liberty
William Kellon Hall .......... Bennettsville
***Raymond Kenneth Hines .......... Spartanburg
†Saundra Leigh Hodge .......... Sumter
Mary Margaret Huntley .......... Ruby
Michael Jeffrey Jackson .......... Swansea
Frank Rawlinson McLeod .......... Alcolu
†***Barbara Joy Morris .......... Aiken
†Alicia Ann Neal .......... Orangeburg
Carolyn Ann Owens .......... Anderson
†Michael Martin Ozburn .......... Athens, Ga.
**Nancy Jane Ruff .......... Newberry
†Janet Elizabeth Rushton .......... Easley
Thomas David Skelton .......... Greenville
*Janet Hope Smith .......... Abbeville
**Franklin Laneau Spelts .......... Greenville
†William Paul Spigener, Jr. .......... Columbia
Linnie Rubin Sutcliffe, Jr. .......... Norway
*Michael Angus Walden .......... Charleston
†**Sheppard Layne Ward .......... Isle of Palms
Robert Laurence White .......... Greenwood

Community and Rural Development
Frank Alan Stigh .......... Newberry

Economic Biology
*Douglas Roy Allen .......... Aiken
*Alan Parker Avakian .......... Simpsonville
Robert Mark Beach .......... Walterboro
Zachary John Coronizes .......... Columbia
**Nancy Hutto Dangerfield .......... Columbia
William Roland Dimsdale .......... Greenville
*Cynthia Griffith Eayre .......... Hendersonville, N. C.
*Michael Alvin Griffith .......... Anderson
*William George Hanlin .......... Summerville
Dean Edward Harrigal .......... Aiken
†**Bruce Byron Latham .......... Anderson
Constance Gamble Livingston .......... Atlanta, Ga.
***Alan Louis Rafio .......... Leesburg, Va.
Robert Donovan Schrewe .......... Medina, N. Y.
Miles Douglas Scruggs, Jr. .......... Gaffney
Randolph Paschal Stroupe .......... Spartanburg

Food Science
Kimberly Joyce Brandon .......... Clemson
Jill Marie Fanelli .......... Bridgewater, N. J.
Susan Bosley Faust .......... West Columbia
Maria Teodora Makapugay .......... Columbia
Karen Lynn Patterson .......... Easley
*Cheryl Green Scott .......... Spartanburg
*Patricia Chandler Smith .......... Hebron
*Libby Ruth Sutker .......... Columbia
Plant Sciences

George Robin Alley .......................... Irmo
Elizabeth McCoy Bethea ...................... Lancaster
*Lesa Ann Keen Delliger Bethea .............. Dillon
**Elizabeth Lawrence Boyd ................ Greer
William Harden Boyd ........................ Blackstock
*Celeste DeLaine Boykin .................... Lancaster
Gary Boyce Cromer .......................... Anderson
*Craig Ervin Culbreth ....................... Coconut Creek, Fla.
*Carol Ann Earle .............................. North Augusta
*Stacey Louise Fischer ....................... Yardley, Pa.
Thomas Craig Foster ........................ North Augusta
*Tilden Lee Galloway, Jr. .................. Chesterfield
Martha Agnes Garrison ..................... Easley
*Marilyn Tara Glasscock .................... Lexington
Sara Katherine Harper ........................ Cheraw
George Hampton Harris ..................... Greenwood
Patricia Elizabeth Haven .................. Colorado Springs, Col.
Robert Lee Haygood .......................... Winnsboro
*Carol Ann Highsmith ....................... Spartanburg
†**Catherine Louise Hoey .................. Oxon Hill, Md.
John Louis Jackson, Jr. .................... Clemson

***Anita Lyn King .......................... Dothan, Ala.
*Patricia Alma Lau .......................... Greenwich
*Mary Suzanne Lazor ....................... Annandale, N. J.
Evelyn Frances Liston ........................ Summerville
John Carlton Long .......................... Columbia
*Margaret Goodwin McCulloch ................ Hartsville
*Susan Rae McLeod .......................... Spartanburg
Sharon Ann Morgan .......................... Franklin Lakes, N. J.
William Laurus Northern IV .................. Clemson
*David Calvin Painter ....................... Chesnee
Thomas Heckman Rasch ..................... Munster, Ind.
John Miles Stirwalt, Jr. .................. Waynesboro, Va.
James Larry Thomas ........................ Greenville
George Herbert Thomason .................. Charleston Heights
*John Holden Thorp, Jr. .................... Charleston
*Sandra Tice-Wright ........................ Pendleton
Cynthia Ann Timanus ........................ Charleston
Margaret Elizabeth White .................. Columbia
George David Wilson ........................ Columbia
*Jaye Ann Yavorsky ......................... Woodbury, Minn.

COLLEGE OF ARCHITECTURE

HARLAN EWART McCULRE, Dean

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*Marc Ernest Bryson ....................... Greenville
*Paul Reid Cook ............................... Laurens
Soheila Dianati .............................. Tehran, Iran
Danny Wayne Hassell ........................ Ada, Ohio
Stephen Patrick Herlong ................... Saluda
*Thomas Henry Hoffman .................... Lawrenceville, N. J.
Janet Alice Kelly ............................. Pembroke Pines, Fla.
Moray Stephen Leighton .................... Toronto, Canada
*Elizabeth Owen Lester ..................... Orangeburg

*Patrick Carroll Masterson ................ Virginia Beach, Va.
*Susan Marie Maurer .......................... Clemson
David Norman O'Neal ........................ Aiken
*Mary Diane Schreck ........................ Naples, Fla.
Charles William Slate ........................ Pendleton
*Kimberly Neale Stanley .................... Myrtle Beach
* Dennis Simmons Ward ........................ Florence
Woodward White Williams III ............. Columbia
James Clayton Wine ........................ Greenville

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Building Science

Dennis John Clark .......................... Isle of Palms
**Robert Grubb Fleming .................... Townsville
David Lee Floyd ............................... Cayce
Frank Michael Garner ........................ Belvedere
Gary William Harker ....................... Chapin
Michael Wade Honeycutt .................. Charlotte, N. C.

**Robert Emory Anderson .................. Rock Hill
*Jonathon Edgar Booth ..................... Basking Ridge, N. J.
*R. Scott Boulton ............................ Columbus, Ohio
Edward Delmar Carter, Jr. ................ Orangeburg
Ralph Michael Coleman ..................... Greenville
Robert Douglas Covell ........................ Baldwin, N. Y.
**Cynthia Ruth Davis ........................ Greenville
*David McLendon Driggers, Jr. .......... North Charleston
*Peter Ross Gilstad .......................... Lake Park, Fla.
David Michael Hamilton ................... Charleston
James Robert Johnson ........................ Greenville
Gregory Haynes Lewis ........................ Fairmont, N. C.
Stephen Thomas Lineberger ................ Charlotte, N. C.

*Paul Wayne Hurley ........................ Pensville, N. J.
Mark Valentine Kiosinski .................. Doraville, Ga.
*Stephen Ray Murphy ........................ Silver Spring, Md.
Jeffrey Hooper Owens ..................... North Augusta
James Donald Seward, Jr. .................. Greenville
*Wendell Bryan Stidham ........................ Edgefield

Design

Jay Alan Lubow ............................. North Massapequa, N. Y.
George Thomas MacKnight .................. Barboursville, W. Va.
***Henry James Meherle, Jr. ............... Ft. Walton Beach, Fla.
*Frederick John Mellin, Jr. .............. Cherry Hill, N. J.
William Sidney Page ........................ Manning
Marti Joseph Turner, Jr. .................. Florence
*Rabun Steven Virgo ........................ North Augusta
Richard Jourdan Waterhouse ............. Orlando, Fla.
Andrew William Wells ........................ Miami, Fla.
COLLEGE OF EDUCATION

HAROLD FOCHONE LANDRITH, Dean

BACHELOR OF ARTS

Early Childhood Education

*Melanie Means Baker .................. Westminster
*Jane Ann Bankston .................... Ravenel
Laura Elizabeth Buck .................. Columbus
Richard Douglas Cain .................. Westminster
Sandra Jean Campbell ................. Clinton
**Elizabeth Ann Cook .................. Aiken
Mary Diane Epps ....................... Columbia
Cheryl Ann Ferguson ................... Columbia
Diane Pace Ferguson ................... Gastonia, N. C.
Amelia Dicus Gordon ................... Sumter
Leigh Ann Hunter ...................... Greenville
**Linda Kay Hurst .................... Chesterfield
*Sarah Frances Jones .................. Fort Mill
**Tamatha Jean Ledford ................ Greenville
*Jane Elizabeth Long ................... Athens, Ga.
Carol Ann Luck ....................... Decatur, Ga.

Bachelor of Architecture

*Frankie Coleman Bates ................ Florence
**David Lee Bishop ..................... Hendersonville, Tenn.
Chris Ware McCallister ................ Bernardsville, N. J.
*William Talmadge Sellers, Jr. ....... Lumberton, N. C.
Louis Gray Young ...................... Anderson

Elementary Education

Nancy Carol Addis ...................... Walhalla
**Mary Lynn Allen ..................... Greenville
*Kimberley Louise Ammons ............. Ellicott City, Md.
Jean Marie Anderson .................. Greenville
*Judith Lynn Barden ................... Lexington
Patricia Jean Berry .................... Anderson
*Mary K. Gramling Bishop .............. Orangeburg
*Joan Patrice Blackwell .............. Hartsville
Robin Renee Campbell .................. Laurens
*Margie Kay Chandler .................. Atlanta
*Leslie Jean Churchill ................ Spartanburg
John Steven Coleman ................... Summerton
**Sharon Elizabeth Couture ........... Greenville
*Deborah Jean Crawford ............... Hartsville
Janet Carol Crawford ................... Clinton
*Patsy Growther ....................... Clemson
Laura Browning Duncan ............... Union
*Katherine Elizabeth Eldson ........... Greenville
*Rhonda Gale Evans .................... Starr
*Susan Leigh Fill ...................... North Myrtle Beach
*Joan Elizabeth Finley ............... Pickens
Barbara Ann Fleming ................... Columbia
Vicki Jean Foster ..................... York
*Donna Jean Gardner ................... Spartanburg
**Dorothy Janice Garrison ............ Easley
*Theresa Caroll Gentry ................ Greenville
Donna Lynne Gray ..................... Orangeburg
*Mary Elizabeth Harmon ............... Aiken
**Janet Marie Hatcher ............... Orlando, Fla.
Janice Lynn Hayes ..................... Spartanburg
Audrey Ellen Head ..................... Greenville
Stephanie Faith Hickman ............. Union
Judy Lynne Hinebaugh ................. Rock Hill
Ann Tinsley Holliday .................. Columbia

*Carman Elaine McCall ................ Tamasssee
**Florence Stephenie McCoy ............ Aiken
Carolyn Ann Monroe ................... Greenville
Terrell Lane Moore .................... Anderson
Donna Guest Owens .................... Greer
*Karen Jones Peppers .................. Clemson
*Gale Shirley Reddell ................. Summerville
*Susan Vernelle Richbourg ............ Union
*Cathy Anne Thomas .................... Orangeburg
*Trudy Anita Thompson ............... Camden
*Deborah Ann Timms .................... Rion
*Peggy Ruth Truluck ................... Walterboro
*Judly Elaine Wilson ................... Spartanburg
*Lucie Jayne Wilson ................... Starr
**Paula Dianne Wolff .................. Anderson
Judith Stubbs Young ................... Sumter

*Franklin Gaines Honeycutt ........... Chattanooga, Tenn.
*Teresa Diane Hornick .................. Seneca
*Maryllyn Darlene Johnson ............ Anderson
***Sarah Elise Long .................... Laurens
*Melissa Rowe Mackie ................. Summerville
Margaret Nan McCown .................. Anderson
Jarry Lee McKinster ................... Clemson
Elizabeth Gaffney McWilliams ........ Joanna
Gail Diane Mellette ................. McClellanville
***Nancy Elias Miller ................. Six Mile
Mary Martha Morgan ................... Gaffney
Joseph Walter Moss .................... Seneca
Julie Muckenfuss ...................... Mt. Pleasant
Sara Lynne Pack ...................... Williamson
*Mary Ann Parker ..................... Easley
*Sarah Minton Patrick ................. Anderson
Debra Faye Polk ....................... Summerville
Richard Karl Raker .................... Oakland, Calif.
*Pamela Yvonne Reeves ............... Greer
**Amy Elizabeth Richardson ........... Jacksonville, Fla.
Cynthia Ross ......................... Columbia
**Margaret Miller Shell ............... Laurens
*Adell Marie Sheppard ................. Columbia
**Kathy Dianne Strickland ............ Chester
Doris Frances Tice .................... Bishopville
Jean Celeste Turveyville ............. Georgetown
**Martha Ann Vaughan ................. Fountain Inn
*Ann Louise Walczyk ................. Chelmsford, Mass.
*Debra Jeanne Walker ................. Williamston
***Mary Josephine Warren ............. Charlotte, N. C.
Cathy Dianne White ................... Darlington
*Robin Leah Wimburn ................. Hartsville
Susan Lynnette Zeigler ............... Fairfax
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### BACHELOR OF SCIENCE

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### COLLEGE OF ENGINEERING

**LYLE CHESTER WILCOX, Dean**

**BACHELOR OF SCIENCE**

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Engineering Technology

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Gerard Michael Crowe Middletown, N. J.  
Jessie Deane Eaker Cherryville, N. C.  
*Ernest LeRoy Funderburk Neeses  
Marvin Lee Hayden Honea Path  
**Ralph Waldo Johnson III Greer  
*Bradford Paul Jones Summerville  
***Avinash Lalji Kotecha Greenville  
William Eugene McMurray Camden

John Thomas Moll Taylors  
Curtis Coleman Mullinax, Jr. Charleston  
Mohammad Salim Clemson  
Bruce William Strain Lugoff  
Gary William Sumerel Laurens  
Stephen Eugene Swords Pickens  
*Kaizar Fidahusein Udailpuri Spartanburg  
James Thomas Vaughn Greer  
Alice Lane Warnock Charlotte, N. C.  
Maurice C. White III McCormick  
William Alonzo Williams III Pinopolis

Mechanical Engineering

Lewis Bickley Bagwell Clemson  
William Frederick Beacom Wilmington, Del.  
*Francis Rufus Bourne Georgetown  
*James Eugene Carlton Greenville  
Diana Lynn Colgrove Midland, Mich.  
Carl Alan Cromer Greenwood  
William Scott Cromer Lexington  
*William John Ellis, Jr. West Palm Beach, Fla.  
George Ralsa Fuller Greenwood  
**William Durward Gregory, Jr. Charleston  
Stephen Hoyt Hancock Gastonia, N. C.  
George Ray Hannah, Jr. Latta  
**Robert Jeffries Harrington, Jr. Aiken  
*Vaughn Harris Howard Charleston  
**Charles Sander Johnson Atlanta, Ga.  
Charlie Monroe Johnston III Lexington

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Joey Leslie Neal Woodruff  
Robert Steven Plemmons Gaffney  
Harry Arthur Plexico Columbia  
*Rutledge Lee Scarborough Hemingway  
James Joseph Scott III Charleston  
Rodrick Miles Sutterlin Collingswood, N. J.  
***Jeff David Thomas Hampton  
*James C. Tolbert Greenville  
Robert Frederick Unser Hampton  
James Marion Wieters Charleston  
*Ronald Dean Wilson North Augusta  
*Randall Brian Wingo Spartanburg

COLLEGE OF FOREST AND RECREATION RESOURCES

BENTON HOLCOMB BOX, Dean

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William Gordon Cavado Anderson  
Leon Lee Chadwick Columbia  
Robert Alan Drummond Jefferson Township, N. J.  
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*Kenneth Earl Graden Lantana, Fla.  
*Gary George Haehle Cincinnati, Ohio  
Jack Newsome Harper Summerville  
Clifton Wayne Haversat Beaufort  
Joseph Oliver Hemingway, Jr. Sumter  
Dennis Michael Hill Spartanburg  
William Middleton Holmes Chapin  
*Paul Russell Howe Rock Hill

Marcus Kenney Jacobs North Augusta  
Craig David Kane Pitman, N. J.  
Chester Manning Kearse, Jr. Fairfax  
Lois Drysdale MacNaughton Columbia  
William Finney McCravy Columbia  
Larry Wayne McCullough Clemson  
*Steven John Muzal Clemson  
***Richard Kent Myers Decatur, Ga.  
Franklin Marion Pearson, Jr. Statesboro, Ga.  
Benjamin Scott Richardson Florence  
*John Edgar Runyon BeCincinnati, N. J.  
**Robert Curtis Shaw Chesterfield  
Donald Joseph Swaysland Six Mile  
Warren Township, N. J.  
William Rediford Taylor III Kershaw  
Stanley William Vaughan Mauldin  
Arthur Edward Wine Six Mile
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*Gerald Edward Atkinson ____________ Clemson
Robert Neely Booker ____________ Clemson
George Osgood Bramlette __________ Greenville
Bryant Carlton Brown ____________ Greenville
Jana Downing Buchanan __________ Greenville
Paul Brooks Coakley _______________ Clemson
*Donna Rene Cox _________________ Greenwood
David Wilson Duncan ______________ Rock Hill
Robert McDow Duncan, Jr. ____________ Union
Pamela Kaye Ellenburg ___________ Greenwood
*Marnie Mason Emory ______________ Governors Island, N. Y.
Louis Allen Garlington, Jr. ___________ Union
Mary Gemma Geilfuss _____________ Mt. Pleasant
*Drema Sue Greer _________________ Lenoir, N. C.
James Henry Hinson, Jr. _____________ Mauldin
Jeanne Addison Hodge ___________ Sumter
*Carol Marie Therese Hofmeyer ________ Boca Raton, Fla.

Wood Utilization

Roy Edwin Belser _____________ Summerton
John Martin Samulski __________ North Augusta

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WALLACE DABNEY TREVILLIAN, Dean

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Mark Henry Duce ________________ Maitland, Fla.
Robert Mahon Morgan __________ Greenville
William Arthur Shirley __________ Hartsville

*Daniel Jonathan Slottje __________ Vistal, N. Y.
Anne Dwyer Stahlsmith __________ Greenville
*Jane Marie Tewkesbury ____________ Aiken

BACHELOR OF SCIENCE

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**Jeffery Raymond Banish __________ Greenville
William Edward Cathey ____________ Anderson
Sherry Lee Cobb _________________ Feasterville, Pa.
*Lorenda Lea Dasher ______________ Miami, Fla.
*Kenneth Robert Fisher _____________ Greenville
Rene Rochester Garcia ______________ Seneca
Deborah Ann Hayes ________________ Greenville
*Mark Thomas Hobbs ______________ Lynchburg
Richard Timothy Howard __________ Greenville
Rodney Keith Kelley _______________ Pelzer
Robert James Kenney _____________ Jacksonville
**Michael Steven Livingston __________ Bishopville
Robert Thomas Owen ______________ Summit, N. J.
*Russell Pierce Patterson __________ Beaufort

Karen Sonja Phillips ________________ Columbia
Albert Lee Powell III ______________ Greenville
James Theodore Robertson, Jr. ____________ Charleston Heights
Jean Marie Robuck ________________ Spartanburg
**Teresa Renea Saxton ______________ Anderson
**Thomas Fredrick Shreve ___________ Newman, Ga.
**Deborah Leigh Thacker ____________ Columbia
Robert Wadsworth Tillison, Jr. __________ Greenville
**Margaret Jean Truett ______________ Manning
*Sarah Lewis Turner _______________ Camden
*Kathy Pearson Walker ______________ Williamston
*Marsha Anne Ward ________________ Columbia
*Kathy Alfreda Watts ______________ Blacksburg
Philip David Weinberg _______________ Fairfax, Va.
**Administrative Management**

*Arthur Rudolph Ailes_ Greenville
Thaddeus Allen_ Charlotte, N. C.
Carol Anne Bailey_ Greenville
Loyd Bryson Beebe_ Anderson
Michael Wade Beccher_ Martin, Ga.
*Nancy Lynne Burden_ Anderson
Linda Susan Burkett_ Daytona Beach, Fla.
Mark David Butterworth_ Plantation, Fla.
Terry Smith Campsen_ Isle of Palms
Meredith Fellers Cleland_ Lancaster
Franklin Delano Conrad II_ Greenville
David Joe Count_ Sullivan's Island
*Clare Lorraine Cunningham_ Greenville
*Donald Smith Curtis_ Johnston
*Kenneth Eugene Darr, Jr._ Spartanburg
Bradley Charles Davis_ Greenville
Kevin John Degnan_ Columbia
Kathy Clement Dillon_ Clemson
**Thomas M. Dryden_ Winter Haven, Fla.
*David Peter Dubinsky_ Rockville, Md.
Kathleen Marie Dunn_ Atlanta, Ga.
*Laura King Erskine_ Mooreville, N. C.
Charles Ray Farrow_ Fountain Inn
*Kenneth David Feryus, Jr._ St. Matthews
Jane Sutherland Foster_ Honea Path
Richard Dean Gaddy_ Latta
Joseph Paul Gaugh_ Sumter
*William Reese Gee_ Kingstree
*Sandra Gail Gilbert_ West Columbia
William McCray Goodson_ Sumter
Nancy Jean Gould_ Spartanburg
Haskell Chevis Grant_ Anderson
*Nicholas Burts Guzman_ Ware Shoals
Joseph David Haglan_ Conway, Pa.
Michael Keith Hassell_ Allendale
Ralph Edward Henderson, Jr._ Hartsville
William Franklin Hendrick, Jr._ Columbia
Robert Mark Herrin_ Walterboro
Richard Wayne Holland_ Seneca
Ollie Thomas Holmes_ Johnston
Rita Dianne Hornick_ Seneca
*Jeffrey Dennis Howard_ Greenville
Milbra Ann Jackson_ Edgefield
Lara Lynn Jowers_ Columbia
*Mark Barry Kalitz_ Edgefield
Barbara Louise Keil_ Maitland, Fla.
Frank Lavaughn Keisler, Jr._ Leesville
John Carlos Lewis, Jr._ Greenville
*Lee Thomas Lineberger_ Kingstree
Lewis Oliver McCullister, Jr._ Spartanburg
Charles Alvin McCutcheon_ Lake City
Joseph Bryan McDevitt, Jr._ Clemson
*John Martin Mc Dow_ Lancaster
Lisa Jones Mills_ Greenville
Catherine Virginia Minick_ North Charleston
Robert Bradfield Morris_ Beaufort
James Walter Ardell Murphy_ Taylors
Daniel Edward Nation_ Spartanburg
Theodore Harry Palmer_ Columbia
Charles F. Paterno_ Ramson, N. J.
Anderson Lee Patrick_ St. George
Reene Charmien Rabb_ Jenkinsville
*Barbara Ann Rivers_ Mt. Pleasant
Edward Henry Schaefer III_ Defiance, Ohio
Edgar Leonard Scott_ Anderson
Elizabeth Dantzler Shule_ Columbia
Kevin Joe Smathers_ Brevard, N. C.
(Degree awarded posthumously)
John Foster Smiley, Jr._ Sumter
Susan Jocn Smiley_ Goldsboro, N. C.
*Rhonda Sue Spillar_ Mt. Pleasant
William Leonard Stein_ Anderson
*William Clayton Stewart_ Lake City
David Rivers Stone_ Greenville
*Mary Elizabeth Stone_ Greenville
David Eugene Strange_ Sumter
Robert Alan Sutton_ Greenville
Clifford Chester Thompson_ Greenville
Frank Austin Thompson II_ Conway
Pamela Ann Turner_ Greer
Broadus Tillman Vaughan, Jr._ Union
*Charles Edward Vincent III_ Dillon
Gary John Watkins_ Greenville
**James William Watkins_ Chapin
*Gary Coleman Webb_ Graham, N. C.
Nancy Jane Wiegand_ Lancaster
Cynthia Lynn Wilson_ Columbia
Stephen Lee Wright_ Jacksonville, Fla.
Joel Steven Wy n_ Greenville

**Economics**

*Sandra Barnett Bagnal_ Columbia
***Robert David Black_ Anderson
*Nathan West Childs_ Anderson
James Danny Fisher, Jr._ Hixson, Tenn.
*Gary Bryan Frederick_ Boca Raton, Fla.
***James Russell Hall_ Anderson
Peter Edmonds Hite_ Florence
Mitchell King III_ Greenville
Thomas Todd Lankford_ Potomac, Md.

*Brian Samuel Leonard_ Reidville
Thomas Glenn MacDonald_ Isle of Palms
Timothy Paul Mertz_ Rockville, Md.
James Stephen Murphy_ Mountain Lakes, N. J.
Gary Thomas Plyler_ Columbia
Kevin Picot Pruter_ Salem, Va.
*Dianna Lee Wooten_ McLean, Va.
William Wade Wyatt, Jr._ Anderson
**Financial Management**

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<td><strong>Elizabeth Sanders Allen</strong></td>
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**Industrial Management**

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<td><strong>Robert Gregory Kramer</strong></td>
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**Textile Chemistry**

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<td>Johnnie Wayne McCollum</td>
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**BACHELOR OF TEXTILE TECHNOLOGY**

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<td><em>Faith Elliott</em></td>
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<td>Honea Path</td>
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<td><em>Laura Irene Hevesey</em></td>
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**COLLEGE OF LIBERAL ARTS**

**HEADLEY MORRIS COX, Dean**

**BACHELOR OF ARTS**

**English**

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<tr>
<td><em>James Ross Allen III</em></td>
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<td><em>Mary Letitia Barnhill</em></td>
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<td>*<em>Dan Lindsay Batson</em></td>
<td>Marietta</td>
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<td><em>Kathy Ann Biringer</em></td>
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<td><em>Carla Griffin Blair</em></td>
<td>Central</td>
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<td>Stanley Douglas Copeland</td>
<td>Surfside Beach</td>
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<td><em>Mark Hayward Cottle</em></td>
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<td>***Margrethe Hamilton Darby</td>
<td>Myrtle Beach</td>
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<td>**Barbara Wilkerson Donnelly</td>
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<td>James Steven Kelley</td>
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<td>Newberry</td>
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<td>Gaffney</td>
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<td>Virginia Marshall Shell</td>
<td>Shelbyville, Tenn.</td>
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<td>Bobbi Lane Shook</td>
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<td><em>Cynthia Anne Smith</em></td>
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<td><em>Jerry Nicholas Theos</em></td>
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<td><em>Stephanie Autumn Whispekey</em></td>
<td>Acworth, Ga.</td>
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<tr>
<td><em>Jerry Newton Whittle</em></td>
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<td>Jeffery Ann Short Yang</td>
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</table>
William Marshall Brock  --- Spartanburg
* Lynne Renee Brown  --- Hanahan
*** David Bruce Buechler  --- Louisville, Ky.
Andrea Lee Coccia  --- Rockville, Md.
*Linda Carol Flake  --- Swansea
** William Michael Foiles  --- Columbia
David Jon Foster  --- Summerville
**Stephen Ray Fuller  --- Spartanburg
** Edward Thornton Garrett  --- Anderson

Pamela Joyce Gordon  --- Columbia
* James Scott Mills  --- Winter Park, Fla.
*** Jesse Lee Scott  --- Greenwood
* Mary Chesnut Shoolbred  --- Spartanburg
James Michael Tollison  --- Fountain Inn
Alice Merilyn Varn  --- Sullivan's Island
Donna Maria Villepontieux  --- Charleston
Roland Franklin Wooten III  --- Charleston

* Anne de Pujo  --- Aiken
** Robin Lynn Dunwoody  --- Fort Walton Beach, Fla.
*Bryan Mild Golson  --- Columbia
John Philip Hall  --- Taylors
* Martha McFall Nelson  --- Augusta, Ga.

* Barbara Jane Pinder  --- Seneca
* Caroline Ragan  --- Hopkins
** Mary Lynn Van Sickle  --- Wheaton, Ill.
Linda Annette Vance  --- Greenville
Sandra Denise Wooten  --- Greer

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Joan Dianna Aycock  --- Greenville
Kevin Mitchell Barth  --- Marion
* Jerry Danny Bibb  --- Seneca
Brenda Ann Bly  --- Orangeburg
Myron Butch Boloyan  --- Bloomfield Hills, Mich.
Susan Marie Brady  --- Greenville
* Alfred Vennison Brown, Jr.  --- Hartsville
** Preston Ratliff Burch  --- Union
Donald Cauthen Corvette  --- Charleston
* Pascal DeSutter  --- Harrison, N.Y.
James Dorsey Dyer  --- Summerville
Thomas Martin Elrod  --- Anderson
* Victoria Margaret Eynon  --- Chevy Chase, Md.
Virginia Florence Gressette  --- St. Matthews
** Elizabeth Anne Grimes  --- Spartanburg
Darleen Elizabeth Jones  --- Brandon, Fla.

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Dennis Yuan-Hsing Kho  --- Oak Park, Mich.
* Susan Virginia Lonas  --- Waynesboro, Va.
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* Robert Stephen Matthews  --- Clemson
Steven William Mcmahon  --- Sumter
Cynthia Annette Moore  --- Gaffney
Susan Jane Nickles  --- Greenwood
* Patrick Francis O'Dea  --- Mauldin
** Kenric Edwin Port  --- Charleston
Lamar Randolph Smith, Jr.  --- Greenville
* Louise Hicklin Boyd Stoddard  --- Spartanburg
Robert Ray Sutphin  --- Beaufort
* Maisie Joy Wallace  --- Dillon
Michael Calvert West  --- Spartanburg
** Thomas Henry White IV  --- Fairbanks, Alaska

Jerry Wayne Ables  --- Liberty
Lisa Catherine Banes  --- Greenwood
* Denise Karen Blakeney  --- Pageland
* Deborah Ruth Bond  --- Florence
Raymond Edward Cobb  --- Union
* Janice Lynn Dietz  --- Spartanburg
** Robert Olin Fralick  --- Walterboro
* William Calvin Garrett III  --- Charlotte, N.C.
Marcia Elaine Hamby  --- Greenville
Nancy Lee Hamilton  --- Union
* Walter James Harper  --- Andrews
* Kathy Sue Holder  --- Columbus, Ga.
** Charles Phillip Holliday  --- Six Mile
** Joseph Anthony Hunter  --- North Augusta
Juli Frances Jeffcoat  --- Plant City, Fla.
Donna Victoria Leach  --- Greer
Merrianne Leaphart  --- Prosperity
* Lisa Marie Livingston  --- Charleston
Frances Marie Looper  --- Easley
Mark Andrew Maresca  --- Greenville

Bruce Alan Mathis  --- Norfolk, Va.
* Laurice Allen Monteith  --- Atlanta, Ga.
Debra Lynn Ouzts  --- Aiken
John Dewey Pearson  --- Anderson
Shelby Lavon Perry  --- Selah
* Mary Key Rentz  --- Branchville
Julie Ann Reynolds  --- Clemson
Robin Richards  --- Tampa, Fla.
Timothy Charles Sisk  --- Seneca
Eston Woodrow Skinner, Jr.  --- Greenville
** Evelyn Irene Sloger  --- Anderson
* Charlotte Ann Taylor  --- Johnsonville
*** Karen Taylor  --- Aiken
** Stephen Phillip Taylor  --- Clemson
* Elizabeth Marie Washington  --- North Palm Beach, Fla.
* Frank Burnette Watts  --- Central
Kathryn Williams  --- Fort Mill
*** Pamela Williams  --- Greenwood
William Keith Mickey Wilson  --- Greenville
Sociology

Gail Elizabeth Anderson Cresskill, N. J.
Yolanda Ann Atkinson Chester
*LeAnne Black Hoffman Estates, Ill.
*Susan Elizabeth Bowden Greenville
Julia Renee DeBroh Columbia
Susan Hagy Camden
Pamela Jane Hall Wadsworth, Ohio
*Rozlynn Shapiro Jenkins Anderson

*Barbara Ann McDowell Charleston
Alton Leslie McElvan Hamer
Stephen Cornelius McNeely Greenville
*Susan Lynette Powell Hanahan
Mary Rebecca Stone West Columbia
Judith Helen Willson Basking Ridge, N. J.
**Clyo Marganna Wilson Greenville

Double Major

French and History

*Furman Lee Bagwell Williamston

English and Political Science

Richard Lee McCall Orangeburg

COLLEGE OF NURSING

GERALDINE LABECKI, Dean

ASSOCIATE IN ARTS

Nursing

Pamela Diane Arrington Waynesville, N. C.
Amy Lou Blackwell Kershaw
*Bobbie Peterson Bledgett Walhalla
Rebecca Gayle Branham Camden
Kathy McGuffin Broderick McMurray, Pa.
*Peggy Jane Burdette Anderson
Cheryl Payton Chastain Anderson
Marcia Ann Collins Anderson
Diana Beaufort Dent Greenwood
Jacquelyn Phillips Farmer Greenville
Cathy Elaine Gentry Summerton
Helen Sydney Harper Seneca
**Nancy Lynn Hirsch Myrtle Beach
*Margaret Ann Hughes Anderson
*Susan Yount Hughes Anderson
*Vivian Clark Jewell Anderson
**Andrea Elsbeth Johnson Easley
**Belinda Beth Jones Greenville

*Gloria Elaine Keller Toccoa, Ga.
*Susan Elizabeth Kincaid Charlotte, N. C.
Cathy Sue King Anderson
Margaret Yvonne Lowder St. Matthews
Susan Phillips Makson Anderson
Susan Virginia Martin Seneca
Lisa Ellen Novotny Aiken
Kari Gwyn Padgett Batesburg
Marilyn Louise Platt Anderson
Patricia Joan Price Greenville
*Joanna McPherson Ramsey Anderson
Robin Elizabeth Reeder Camden
**Sharon Elizabeth Reedy Charleston
Cynthia Diane Tant Pickens
*Kathleen Kidd Vandiver Hartwell, Ga.
Paula Jane Watt Pickens
Carol Lee West Camden
Leslie Rae Adair Ziegler Mt. Pleasant

BACHELOR OF SCIENCE

Nursing

*Vivian Rachel Allen Hartsville
Carol Ann Alleyne Georgetown, Guyana
Cheryl Ann Ballard Kernersville, N. C.
*Rachel Rebecca Baxley North Augusta
**Hannah Poston Bedenbaugh Pamplico
*Delwin Blanche Blair Jonesboro, Ark.
**Rachel Alice Blanton Seneca
Sonya Raines Brantham Winnsboro
*Amy Sowell Braswell Chesterfield
**Emily Susan Carnes Pageland
Mary Elizabeth Collier Lancaster
Bridge Anne Crowley Neptune, N. J.
Donna Ryan Douis Hanahan
Mary Louanne Duke Columbia
*Debra Hope Easterling Bowman
***Peggy Crawford Emanuel Lancaster
*Lydia Patricia Emich Greenville
Wanda Kay Fant Greenville
*Elizabeth Joan Fowler Greer

Virginia Marie Gioiosa Central
Laura Blue Greer Aberdeen, N. C.
*Pamela Brooks Grooms Greenville
Susan Diane Hawkins Orangeburg
Adriane Lynn Holland Belmont, N. C.
Rhonda Darlene Hughes Enoree
*Ellen Kae Inabinet Hartsville
*Elizabeth Lynn Jeffords Goldsboro, N. C.
*Lisa Ann Jones Columbia
*Richard Thomas Lally Greenwich, Conn.
Nina Denise Lee-Pittman Ware Shoals
Sylvia Marie Lewis Statesville, N. C.
*Cathy Renee Lowe Greenwood
Midge Leigh Luttrell Summerville
*Judith Winslet Major Greenville
*Claudia Ann Martin Dacusville
Mary Loris Martschink Charleston
Sharon Elizabeth McFadden Covington, Ga.
### Student Register 375

<table>
<thead>
<tr>
<th>Student Name</th>
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<tr>
<td>Barbara Jean Meyer</td>
<td>Cinnaminson, N. J.</td>
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<td>Susan Kim Sanders</td>
<td>Charleston</td>
</tr>
<tr>
<td>*Jane Martinosky Scheer</td>
<td>Pickens</td>
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<tr>
<td>Rebecca Keels Shuler</td>
<td>Sumter</td>
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<tr>
<td>Susan Rebekah Singleton</td>
<td>Sumter</td>
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<tr>
<td>Sandra Lee Snelgrove</td>
<td>Camden</td>
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</table>

### Nursing (continued)

<table>
<thead>
<tr>
<th>Student Name</th>
<th>City</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carolyn Renee Stallings</td>
<td>Belton</td>
</tr>
<tr>
<td>Joyce DeDominicis Stanley</td>
<td>Miami, Fla.</td>
</tr>
<tr>
<td>Susan Joan Stewart</td>
<td>Columbia</td>
</tr>
<tr>
<td>Lily Ellen Pascoe Stone</td>
<td>Williamson</td>
</tr>
<tr>
<td>Marie Wilmore Sullivan</td>
<td>Summerville</td>
</tr>
<tr>
<td>*Anne McLean Taylor</td>
<td>Columbia</td>
</tr>
<tr>
<td>**Deborah Lynn Thomas</td>
<td>Columbia</td>
</tr>
<tr>
<td>*Patricia Ann Townsend</td>
<td>Greenville</td>
</tr>
<tr>
<td>Mary Gay Trado</td>
<td>Anderson</td>
</tr>
<tr>
<td>Patricia Lynne Varnadoe</td>
<td>Sumter</td>
</tr>
<tr>
<td>*Mary Bazemore Watson</td>
<td>North Augusta</td>
</tr>
<tr>
<td>Karen Elizabeth Wilson</td>
<td>Durham, N. C.</td>
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<tr>
<td>Julie Juanita Worley</td>
<td>Eustis, Fla.</td>
</tr>
<tr>
<td>Janice Lynn Wright</td>
<td>Gainesville, Ga.</td>
</tr>
<tr>
<td>Joan B. Yoder</td>
<td>Clemson</td>
</tr>
</tbody>
</table>

### COLLEGE OF SCIENCES

**HENRY ELLIOTT VOGEN, Dean**

#### BACHELOR OF ARTS

**Chemistry**

*Milton Sherman Costa  Charleston*

**Geology**

*Walter Hawkins Brosnan  Asheville, N. C.*

*James Edward Furr  Florence*

*Rebecca Elaine Taylor  Columbia*

**Mathematical Sciences**

††Susan Elaine Bogan  Buffalo

*Lisa Marie Brooks  Winnsboro*

*Lloyd Bruce Brown  Charleston*

*Anthony Curtis Buchanan  Marietta*

*Ned Robert Burgess  Travelers Rest*

†***Virginia Ruth Boroughs Dwyer  Pickens*

**Janice Marie Flatt  Clemson*

*Deanna Lee Koefoed  Summerville*

*Mary Kate Tanner  Georgetown*

***Gregory Dale Trammel  Rock Hill*

### BACHELOR OF SCIENCE

**Biochemistry**

***Jane Wilma Cutler  Greenville*

***Cinda Sue Herndon  Lancaster, Ohio*

*Robert Jay McDonald  Rochester, N. Y.*

*Leslie Anne McMahon  Greenville*

**Cynthia Sessions  Columbia***

***Forrest Leigh Thompson  Clemson***

**Botany**

**Beneta Mabrion Culpepper  Jacksonville, Fla.**

*Kathleen Louise Escue  Pelion*

**Chemistry**

*Geoffrey David Alexander  Clemson*

**Richard Eric Davis  Anderson***

*Edward McDonald Huie  Atlanta, Ga.*

*Charles W. Peck  Amsterdam, N. Y.*

**Geology**

*Stephen Knight Kerr  Simpsonville*

*Michael David Prater  Greenville*
Mathematical Sciences
*Amy Ruth Brooks  _______ Columbia
*Jeryl Ann Caporaso  _______ New York, N. Y.
Joseph Stuckey Corbett  _______ Paxville
*Mary Elaine Feagles  _______ Columbia
Robin Josephine Graham  _______ Greeleyville
William Wayne Hayes  _______ Anderson
Christine Foster Heisler  _______ Indian Harbour Beach, Fla.
*Deryl Lynn Jeffcoat  _______ Greenwood
William Earl Knupp  _______ Easley
*John Rutland Lewis  _______ Chester
*Kathy Pohiman Lofton  _______ Seneca

**Reba Kaye Evans  _______ Hartsville
**Sandra Jeanne Moody  _______ Eustis, Fla.

Medical Technology

*Glenn Mark Mahony  _______ Charleston
*Malcom Edward McClure  _______ Landrum
Sherry Robin O'Sheal  _______ Walhalla
*James Stanley Phillips  _______ Honea Path
Douglas Russell Plumley  _______ Landrum
**David Paul Rodgers  _______ Anderson
*David Kevin Smith  _______ Greenville
Laura Stallworth  _______ Jacksonville, Ala.
Harriet Nelle Strickland  _______ Anderson
*Wallace Edgar Vaughn  _______ Fort Mill
Calvin Rodney Waters, Jr.  _______ Williamson
Esther Elaine Watson  _______ Mauldin
***Dawne Hair Wimbrow  _______ Greenville

Microbiology

**Lee Ann Allen  _______ Columbia
Arthur Leonard Belge  _______ Florence
*Vincent Kelly Bunning  _______ Greenville
George William Campbell, Jr.  _______ Greenville
***Pamela Ann Craven  _______ Waynesboro, Ga.
*Cynthia Kay Duke  _______ Kingsport, Tenn.
**George Paul Economy  _______ Florence
James Michael Fairfax  _______ Chester
*John Keith Garrett  _______ Wilkesboro, N. C.
Diane Elizabeth Gniadkowski  _______ Aiken
*Laurie Angel Hogan  _______ North Augusta
***Michael Morrison Hughes  _______ Anderson
*Samuel Keith Hutto  _______ Columbia
*Richard Alan King  _______ Lancaster
Ann Michiko Kozuchi  _______ Charleston

Robin Leigh Loftin  _______ Easley
*Anthony Charles Martin  _______ Greenville
John Marshall McGahan  _______ Starr
*Margaret Jacquelyn Nye  _______ Mullins
*Albert Edwin Odom  _______ Orangeburg
*Kalu Irem Ogbonnaya  _______ Ututu, Imo State, Nigeria
**Julia Christine Olson  _______ Spartanburg
Sharon Lee Paradowski  _______ Taylors
Sharon Ann Prbybowski  _______ Decatur, Ga.
Brian Patrick Quinn  _______ Bay Shore, N. Y.
Shannon Gene Shepherd  _______ Greenville
Hugh Coleman Timms III  _______ Greenwood
*Raymond Scott Turner  _______ Chester
***Mary Lisa Watson  _______ Elgin

Physics

**Wilson Lee Brasington, Jr.  _______ Lancaster
*Richard Stuart Reid  _______ Frederick, Md.

†**David Semmes Sherrill  _______ Clemson

Pre-Professional Studies

*Penelope Louise Call  _______ Summerville
Joseph Copeland Dorn  _______ Summerville

Zoology

*John Newton Cagle III  _______ Florence
**Dexter Lee Cook, Jr.  _______ Lancaster
*Christopher Russell Crawford  _______ Atlanta, Ga.
Vanderveer Reed Crawford  _______ Clemson
†**Daniel Brian Gant  _______ Pennsville, N. J.
*Albert Thomas Gilpin, Jr.  _______ Columbia
*James Walter Goforth  _______ Greenville
Lisa Michele Goodrich  _______ Clemson
*Larry Douglas Grubb  _______ Seneca
*Stephen Harris Hand  _______ Columbia
*James Herman Irby, Jr.  _______ Hartsville
Walt John Keeshen III  _______ Ridgefield, Conn.

David John Lonergan  _______ Oakland, Cal.
**David Turner Marshall  _______ Spartanburg
*Patricia Elaine Maxwell  _______ Greer
Robert Alexander Miller  _______ Easley
David Vernon Osteen  _______ Aiken
*William Bruce Painter  _______ Gaffney
Myron Keith Perlitz  _______ Charleston
Eddie Moses Robinson  _______ Columbia
**Stephen Hubert Sims  _______ Lancaster
***William Paul Skelton III  _______ Spartanburg
***Gayle Elizabeth White  _______ Anderson
††Mark Alan Yarborough  _______ Wilmington, N. C.

* With honor: A grade point ratio of 3.00 to 3.49
** With high honor: A grade point ratio of 3.50 to 3.79
*** With highest honor: A grade point ratio of 3.80 or above
† Senior division honors: The students so designated have earned a B or better in 12 credits of honors work at the upper division level, have a minimum GPR overall of 3.00, and have been recommended by their department or college.
MASTERS’ AND EDUCATION SPECIALISTS DEGREES CONFERRED MAY 11, 1979

ARNOLD EDWARD SCHWARTZ, Dean, Graduate School

COLLEGE OF AGRICULTURAL SCIENCES

MASTER OF AGRICULTURE

Barry Lee Able .......................................... Saluda
Stanley Cyril Baker III ......................... Greenwood
Richard Jay Hack ........................................ Miami, Fla.

Robert Shannon Jennings ...................... Columbia
Donna Marie Leone .................................. Falmouth, Mass.
Ernest Eugene Strickland, Jr. .................. Olanta

MASTER OF NUTRITIONAL SCIENCES

Cathy Buffkin Shirley .............................. Nichols

MASTER OF SCIENCE

Agronomy

Joanne Irene McCarthy ........................ Lake Park, Fla.

Entomology

Michael Tyrone McCarty ........................ Batesburg

Horticulture

Lonny Ray Schmid ................................. Clemson

Poultry Science

Stuart Winston Crawley ........................ Greenville

Wildlife Biology

Daniel Serge Levine ............................... New Orleans, La.

COLLEGE OF ARCHITECTURE

MASTER OF ARCHITECTURE

James Tallie Arrington .......................... Winsboro
William Hunter Bethune .......................... Charlotte, N. C.
Richard del Monte ................................ Hollywood, Fla.
Douglas Bruce Eason .............................. Atlanta, Ga.
Joseph Earl Goforth .............................. North Augusta
Addison Cassel Gottshalk III ...................... West Simsbury, Conn.
Harry Charles Harritos ........................... Atlanta, Ga.
Gregory Thomas Jones ........................... Pisacatway, N. J.
Henry Benjamin Konover ........................ Bloomfield, Conn.
Robert Theodore Matthew, Jr. ............... Clemson
Randall Keith McClain ............................ Pelzer

Robert Warne McClam .......................... Columbia
Scott Paul Sampson ............................... Murrysville, Pa.
David Mitchell Settle ............................ Feasterville, Pa.
David Lee Shook ................................ Anderson
Roberto Luis Sotolongo .......................... Live Oak, Fla.
Peter Charles Sutton ............................... Hightstown, N. J.
John Howard Tabor ............................... Greenville
Robert Stanley Walters ........................ Ft. Lauderdale, Fla.
Dwayne Ercell Wood ............................... Central
Edward Tate Zeigler, Jr. ........................ North Augusta

MASTER OF CITY AND REGIONAL PLANNING

Robert Thurston Clark, Jr. .................. Palatka, Fla.
Anthony Corey ................................ Paducah, Ky.
States Rights Gist Finley III .................. Chattanooga, Tenn.

Linda Karen Stone ............................... Pendleton
Margaret Elizabeth Waldrep .................. Greenville
Frances Elizabeth Wigington .................. Gainesville, Ga.

MASTER OF FINE ARTS

Terry Jarrard Dimond .......................... Marietta

James Morgan Meaders .......................... Clemson
COLLEGE OF EDUCATION

EDUCATION SPECIALIST
Educational Administration
Seth Schafer Heimlich ___________ Clemson

Joanne Mater Thomas ___________ Simpsonville

MASTER OF AGRICULTURAL EDUCATION
(Agricultural Education is jointly administered by the College of Agricultural Sciences and the College of Education.)
Darrell Eugene Blackwelder ___________ Fort Mill

MASTER OF EDUCATION
Administration and Supervision
William Edward Cisson ___________ Easley
Harriett Hydrick Clamp ___________ Pickens
Jerry Allen Crenshaw ___________ Six Mile
Juyne Moffitt Johnson ___________ Walhalla
Larry Richard Rabon ___________ Sumter
Janet Rice Ranke ___________ Westminster

Michael Henry Sanders ___________ Central
Carroll Lewis Sexton, Jr. ___________ Greenwood
Ronald Nathan Talley ___________ New Light Community
Genevieve Rountree Thompson ___________ Greenville
Donald Wayne Watson ___________ Anderson
Geraldine Rudd Wells ___________ Greenville

Elementary Education
Teresa Fowler Barker ___________ Walhalla
Linda Poole Batten ___________ Anderson
Susan Elizabeth Berkland ___________ Clinton
Lynn Crews Boyleston ___________ Columbia
Barbara Tener Clark ___________ Clemson
Linda Diane Coffey ___________ Kingsport
Aleta Holbrooks Coulter ___________ Clemson
Judy Thomas Craft ___________ Honea Path
Carol Elkins Dukes ___________ Newberry
Cynthia Lyles Duncan ___________ Westminster
Mary Gosnell Fisher ___________ Anderson
Linda Walker Fox ___________ Greenville

Peach Foster Fralick ___________ Newberry
Sheila Marie Francis ___________ Greenville
Palmer Jean Gamble ___________ Easley
Leslie Bratton Gambrell ___________ Belton
Brenda Holbrook Garner ___________ Anderson
Elizabeth M. Hair ___________ Easley
Jean Julian Harris ___________ Greenwood
Anna Estes Haskin ___________ Greenwood
Susan Epling Longshore ___________ Newberry
Jane Elizabeth Mahaffey ___________ Duncan
Lillie Thompson Owings ___________ Laurens
Diana Lynn Reid ___________ Anderson

Personnel Services
Loretta Johnson Blakely ___________ Travelers Rest
Linda Taylor Bridges ___________ Greenville
Carole Bryan Burkhart ___________ Westminster
Wanda Ruth Crappa ___________ Conway
Wanda Honea Crooks ___________ Westminster
Vivian Garris Dorsey ___________ Greenville
Gladys Hallams Grantland ___________ Anderson
Marlene Meyer Herazo ___________ Greenwood
Katherine Alford Hughes ___________ Greenville
Dean Gerard Matthews ___________ Lakewood, N. J.
Harold Dean McClain ___________ Spartanburg
Deborah Elaine McIntyre ___________ Greenville

Rose Flory Nelson ___________ Travelers Rest
Mary Ann Brown Osment ___________ Greenville
James Lee Owens ___________ Anderson
Barbara Ann Roberts ___________ Cayce
Patricia Turner Sanders ___________ Anderson
Doris Blackwell Shabazz ___________ Starr
Maris Gail Steinberg ___________ Greer
Forrest Herbert Thieker ___________ Columbia
Debra Clarke Welborn ___________ Piedmont
Frances Harper Williamson ___________ Westminster
Linda Sue Wilson ___________ Travelers Rest
Paden Eskew Woodruff, Jr. ___________ Pickens

Reading
Deborah Gail Bryant ___________ Anderson
Willie Chiles Martin ___________ Clemson

Johnnie Cleo Parker ___________ Greenville
Martha Price Pitts ___________ Westminster

Secondary Education
Patricia Simmons Freeman ___________ Williamston
John David Lyle, Jr. ___________ Walhalla
Betty Jean Myers ___________ Georgetown

Virginia Grace Payne ___________ Spartanburg
Robert Grant Phillips ___________ Walhalla

MASTER OF INDUSTRIAL EDUCATION
Laurence Asbury DeLoach, Jr. ___________ Clemson
James Bryant Harrill ___________ Bennettsville
Jimmy Lee Patterson ___________ Greenville

Wallace Belton Peebles ___________ Seneca
John David Terry ___________ Greenville
Joe Ervin Upchurch ___________ Easley
COLLEGE OF ENGINEERING

MASTER OF ENGINEERING

Civil Engineering
Gary Dana Thompson Columbia

Electrical Engineering
George Frank Bell, Jr. Clemson
Patrick Warren Huntley Charlotte, N.C.

Environmental Systems Engineering
Thomas Gregory Gibbons, Jr. Gaffney

Mechanical Engineering
Marion Cain Boyd, Jr. Seneca
William Ralph Campbell, Jr. West Jefferson, N.C.

Water Resources Engineering
Jimmy Eugene Fowler Lockhart

MASTER OF SCIENCE

Bioengineering
Sawsan Abdul-Muhsen Al-Husseini Amman, Jordan
Russell William Bowden Middletown, N.J.
Brian John Kelly White Plains, N.Y.

Electrical Engineering
Grady Vincent Gowan Roebuck
Lloyd Richard Rochester III Seneca

Environmental Systems Engineering
Donald Wayne Anderson Nashville, Tenn.
Richard Alan Scadden Rockford, Ill.
Brenda Ann Donaloio Mt. Upton, N.Y.
Beth Ellen Wentink Newburgh, N.Y.

Mechanical Engineering
Hung Shih Taipei, Taiwan

Systems Engineering
Charles Robert Moede Joplin, Mo.

Water Resources Engineering
Gerald Eugene Lonon Clemson
Brenda Bruner Worm Clemson

COLLEGE OF FOREST AND RECREATION RESOURCES

MASTER OF FORESTRY

William Charles Cole Taylors
Richard Alexander Harper Walhalla
Dudley Ray Hartel Central
Jiann-Huei Pan Lotung, Ilan, Taiwan

MASTER OF RECREATION AND PARK ADMINISTRATION

David Michael Griffin Glen Burnie, Md.
Daniel Edwin Wegner Port Charlotte, Fla.
John Hamilton Winfield Conway

COLLEGE OF INDUSTRIAL MANAGEMENT AND TEXTILE SCIENCE

MASTER OF ARTS

Economics
Armistead Claiborne Leigh Clemson

MASTER OF SCIENCE

Management
Gary Brian Seithel Charleston
COLLEGE OF LIBERAL ARTS
MASTER OF ARTS

English
Charles Ernest Peitzman ___________ Anderson
Ronald Vincent Rash __ Boiling Springs, N. C.

COLLEGE OF NURSING
MASTER OF SCIENCE

Nursing
Priscilla Webster Ramsey _______ Belmont, Mass.

COLLEGE OF SCIENCES
MASTER OF SCIENCE

Biochemistry
Anthony Vincent Caggiano ___________ Gaffney

Chemistry
Wen-Sheng Kuo ___________ Clemson

Mathematical Sciences
Michael Scott Dennis ___________ Carrollton, Ga.
Joanne Margot Fletcher ___________ Sanford, Fla.
Deborah Hine Frye ___________ Leesburg, Fla.
Jan Renee Garner ________ High Point, N. C.
David Hamilton Hutchens _____ East Bend, N. C.
Roland Bertram Minton _______ Richmond, Va.

Microbiology
Kim Lowell Hellenga ___________ Toccoa, Ga.
Henry Kenneth Lowery, Jr. ______ Hilton Head Island

Physics
Danny Reed Faulkner ____________ Greenville

Zoology
Ruth Boykin Orr ________________ Rembert
DOCTORS' DEGREES CONFERRED MAY 11, 1979

ARNOLD EDWARD SCHWARTZ, Dean, Graduate School

COLLEGE OF AGRICULTURAL SCIENCES

DOCTOR OF PHILOSOPHY

Entomology

John Alex Bass
B.S., M.S., Clemson University
Dissertation: Some Biological Aspects of the Imported Fire Ant, Solenopsis invicta Buren, and Its Chemical Control in South Carolina

Johnny Leo Bernhardt
B.S., M.S., East Carolina University
Dissertation: Ecology of the Mexican Bean Beetle (Epilachna varivestis Mulsant) on Soybeans (Glycine max (L.) Merrill) and Snap Beans (Phaseolus spp.)

Plant Pathology

Bruce Robert Fraedrich
B.A., Newberry College; M.For., Duke University
Dissertation: Etiology and Epidemiology of Pitch Canker on Southern Pines

Helmut Kraus-Schmidt
B.S., University of De Los Andee, Colombia; M.S., Clemson University
Dissertation: Pathogenicity, Population Dynamics and Nematode-Nematode Interactions of Hoplolaimus columbus Sher, Scutellonema brachyurum Andrassy and Meloidogyne incognita Chitwood on Cotton in South Carolina

Clayton Stanley Morton
B.S., Valdosta State College; M.S., The University of Georgia
Dissertation: Studies on Cylindrocladium Black Rot of Peanut (Arachis Hypogaea L.) in South Carolina

COLLEGE OF INDUSTRIAL MANAGEMENT AND TEXTILE SCIENCE

DOCTOR OF PHILOSOPHY

Engineering Management

Wilhelm Andreas Haberkorn
Diploma, Textile Engineering, Reutlingen School of Engineering, West Germany; M.S., Clemson University
Dissertation: Derivation of a Quantitative Model to Assess the Performance of Research and Development Organizations

Management Science

Thomas Barry Edwards
B.S., M.S., Clemson University
Dissertation: On the Degree of Inflation of Measures of Fit Induced by Empirical Model Building

Textile and Polymer Science

Kathryn Angela Jakes
B.S., University of Illinois; M.S., University of Maryland
Dissertation: On the Rate and Significance of Surface Oxidative Reactions in the Flame Spreading of Polypropylene
COLLEGE OF SCIENCES
DOCTOR OF PHILOSOPHY
Mathematical Sciences

Hideaki Kaneko  Tokyo, Japan
B.S., College of Charleston; M.S., Clemson University
Dissertation: Best Approximation in a Banach Space with a Schauder Decomposition

Jerome Luther Lewis  Charleston, W. Va.
B.S., Bob Jones University; M.S., Clemson University
Dissertation: Real Octonions and Certain Octonionic Linear Spaces

Bruce Warren Koehn  Derby, Kansas
B.S., Jacksonville State University; M.S., Clemson University
Dissertation: Stored Energy in the $I_b$ Substage of Aluminum
Clemson-Furman Universities

Masters' Degrees Conferred May 6, 1979

Business Administration

William Thomas Adams .............................................................. Greenville, S.C.
Earl Marcus Anderson .............................................................. Greenville, S.C.
Gregory Stokes Below .............................................................. Taylors, S.C.
Richard Leo Caldwell .............................................................. Racine, WI
Josephine Maxwell Cantrell ....................................................... Fairforest, S.C.
James Warren DeMint ............................................................... Greenville, S.C.
Thomas Eugene DeMint ............................................................. Greenville, S.C.
George Edward Feeney ............................................................. Greenville, S.C.
John Thomas Hannon, Jr. ............................................................ Taylors, S.C.
Joseph Steven Holcombe ........................................................... Greenville, S.C.
William Harrison Huff, III (Summa Cum Laude) ................................. Clemson, S.C.
*Phillip Robinson Huntley .......................................................... Greenville, S.C.
*Wiley Harris Johnson, Jr. .......................................................... Charlotte, N.C.
Connie Joan Kane-Maguire (M.S.)(Summa Cum Laude) ......................... Greenville, S.C.
Walter Moffett Kendrick, III ......................................................... Greenville, S.C.
Curtis Cavney Kimbrell, III ......................................................... Forest City, N.C.
David Clark Kirk, Jr. (Ph.D.) ....................................................... Kalamazoo, MI
William Anthony Klein .............................................................. Greenville, S.C.
Margaret Bruns Kroposki ............................................................ Greenville, S.C.
Siu Chor Lee .............................................................................. New York, N.Y.
*Jane Randall Leonard ................................................................. Madison, MS
James Bryan Little, Jr. ................................................................. Greenville, S.C.
Edward Means Nabers ................................................................. Greenville, S.C.
James Franklin Ridenhour, Jr. ....................................................... Greenville, S.C.
Kenneth Russell Saylor ............................................................... Rock Hill, S.C.
Lawrence Vincent Schilz .............................................................. Greenville, S.C.
*Richard Sayers Ware ................................................................. Greenville, S.C.
Richard Scott Wiggins ................................................................. Bergenfield, NJ

*In absentia

( ) Highest graduate degree obtained other than the MBA
BACHELORS' DEGREES CONFERRED AUGUST 11, 1979

COLLEGE OF AGRICULTURAL SCIENCES
LUTHER PURDEE ANDERSON, Dean

BACHELOR OF SCIENCE
Agricultural Economics
Michael Richard Waites .......................... Chapin

Animal Industries
Marvin Franklin Davis .............................. Norway
Bruce Calvin Johnson .............................. McBee
Constantino Vasilious Nicopoulos ................. Shelby, N. C.

Community and Rural Development
**Andrew Hardee Griffin ............................ Asheville, N. C.
*Christopher Mallon Kunkel ........................ Greenville

Economic Biology
Kenneth Samuel Brownlee .......................... Ware Shoals
Dana Pierson Campbell .............................. Rock Hill
Colwell Ann Cook ................................. Augusta, Ga.
Linda Susan Dryden ................................. Plantation, Fla.

Plant Sciences
Ray Kenneth Allen, Jr. ............................. Piedmont
Robert Leonard Brock .............................. Spartanburg
*Charles Andrew Bussey ............................ North Augusta
Ruth Ayers Edmunds ................................. Abbeville

Pre-Professional Studies
†***Helen Coggeshall Harvey ........................ Beaufort
*Troy Lee Winn ................................. Summerville

COLLEGE OF ARCHITECTURE
HARLAN EWART McCLURE, Dean

BACHELOR OF ARTS
Design
Richard Valleau Chapman ........................ Camden
David Norwood Fisher .............................. Baltimore, Md.

BACHELOR OF SCIENCE
Building Science
William Edward Beard .............................. Central
John Sawyer Clark ................................. Charleston

Design
***Marcelo Alberto Moino ........................ Miami, Fla.

BACHELOR OF ARCHITECTURE
Michael Stroud Watson ............................ Simpsonville
## COLLEGE OF EDUCATION

**HAROLD FOCHONE LANDRITH,** Dean

### BACHELOR OF ARTS

#### Early Childhood Education

<table>
<thead>
<tr>
<th>Name</th>
<th>City</th>
</tr>
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<tbody>
<tr>
<td>Myra Elizabeth Drotor</td>
<td>Spartanburg</td>
</tr>
<tr>
<td>Darlean Johnson Gordon</td>
<td>Greenville</td>
</tr>
<tr>
<td>Deborah O'Neal Posey</td>
<td>Aiken</td>
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#### Elementary Education

<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Joan Stephens Brantley</td>
<td>Pelzer</td>
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<tr>
<td>Marie Brown</td>
<td>Conway</td>
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<tr>
<td><strong>Jacquelyn Louise Coley</strong></td>
<td>Anderson</td>
</tr>
<tr>
<td>Linda Jean Crawford</td>
<td>Flushing, N. Y.</td>
</tr>
<tr>
<td><strong>Linda Merck Crenshaw</strong></td>
<td>Six Mile</td>
</tr>
<tr>
<td>Sharon Gayle Duncan</td>
<td>Nashville, Tenn.</td>
</tr>
<tr>
<td>Julia Elizabeth Ferrell</td>
<td>Spartanburg</td>
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<tr>
<td>Sheila Bonita Glenn</td>
<td>Fairplay</td>
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</table>

#### Secondary Education

<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Coley Sherman Burns</td>
<td>Greer</td>
</tr>
<tr>
<td>Brian Craig Dempsey</td>
<td>Liberty</td>
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<tr>
<td>*Debra Woods Kelly</td>
<td>Gray Court</td>
</tr>
<tr>
<td>Santana Wanda O'Neal</td>
<td>Jenkinsville</td>
</tr>
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</table>

### BACHELOR OF SCIENCE

#### Agricultural Education

(Agricultural Education is jointly administered by the College of Agricultural Sciences and the College of Education.)

<table>
<thead>
<tr>
<th>Name</th>
<th>University</th>
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<tbody>
<tr>
<td>Steven Wallace Carville</td>
<td>Union</td>
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#### Industrial Education

<table>
<thead>
<tr>
<th>Name</th>
<th>City</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albert Hayne McMeekin III</td>
<td>Monticello</td>
</tr>
</tbody>
</table>

#### Science Teaching

<table>
<thead>
<tr>
<th>Name</th>
<th>City</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ronald Douglas Garren</td>
<td>Greer</td>
</tr>
</tbody>
</table>

### COLLEGE OF ENGINEERING

**LYLE CHESTER WILCOX,** Dean

### BACHELOR OF SCIENCE

#### Agricultural Engineering

(Agricultural Engineering is jointly administered by the College of Agricultural Sciences and the College of Engineering.)

<table>
<thead>
<tr>
<th>Name</th>
<th>City</th>
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<tbody>
<tr>
<td>Albert Hayne McMeekin III</td>
<td>Monticello</td>
</tr>
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</table>

#### Ceramic Engineering

<table>
<thead>
<tr>
<th>Name</th>
<th>City</th>
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<tbody>
<tr>
<td>Gerald Hartwell Hastings</td>
<td>Greenville</td>
</tr>
</tbody>
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#### Chemical Engineering

<table>
<thead>
<tr>
<th>Name</th>
<th>City</th>
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<tbody>
<tr>
<td>Richard Gary Anderson</td>
<td>Belton</td>
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<tr>
<td>Donald Chris Batchelor</td>
<td>Gaffney</td>
</tr>
<tr>
<td>Donald Bruce Campbell</td>
<td>Spartanburg</td>
</tr>
<tr>
<td>*Eugene Madison Giddens</td>
<td>Lakeland, Ga.</td>
</tr>
<tr>
<td>*Lawson Scott Kendrick</td>
<td>New Ellenton</td>
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### COLLEGE OF ENGINEERING

**LYLE CHESTER WILCOX,** Dean

### BACHELOR OF SCIENCE

#### Agricultural Engineering

(Agricultural Engineering is jointly administered by the College of Agricultural Sciences and the College of Engineering.)

<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Albert Hayne McMeekin III</td>
<td>Monticello</td>
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#### Ceramic Engineering

<table>
<thead>
<tr>
<th>Name</th>
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<tr>
<td>Gerald Hartwell Hastings</td>
<td>Greenville</td>
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#### Chemical Engineering

<table>
<thead>
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<th>Name</th>
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<td>Richard Gary Anderson</td>
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<td>Donald Bruce Campbell</td>
<td>Spartanburg</td>
</tr>
<tr>
<td>*Eugene Madison Giddens</td>
<td>Lakeland, Ga.</td>
</tr>
<tr>
<td>*Lawson Scott Kendrick</td>
<td>New Ellenton</td>
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</table>
Civil Engineering

Lee Marion Anderson  Florence
**John Linley Baker  Charleston
*Michael Gault Beeson  Marion
Phillip Develle Bowen  Anderson
Alan Kimberly Byrd  Rock Hill
*Michael Neal Byrd  Clemson
John Douglas Davenport, Jr.  Clemson
David Bruce Epstein  Charleston
Henry Thomas Hammond, Jr.  Mt. Pleasant
Mohamad Reza Khazayi  Shiraz, Iran
Ronald Dean Lattimore  Lugoff
Barry Duane Palm  Greenville
Robert Christopher Pickens  Anderson
Gary Dane Taylor  Elkin, N. C.
George Edward Vaughan  Liberty
*Charles Daniel Wilson  Dallas, N. C.
*Edward Whitton Yaun  Aiken

Engineering Technology

Robin Ann Bickley  Aiken
Jerome Ted Gambrell  Belton
*John Jefferson Gray  Lyman
*James Stanley Harris  Pomaria
James Bryan Long  Seneca
George Wallace Seaborn, Jr.  Williamston
*Claude Vanderbilt Whiteford  Laurens

Mechanical Engineering

John Preston Ackerman  Meggett
Arnold Alfred Darley  North Charleston
*John Patrick Gibson  Simpsonville
Thomas Jackson Hancock  Anderson
Vinh Thanh Nguyen  South Salem, Ore.
Whit Holleman Plyler  Seneca
John Mason Suggs  Columbia
James Hurst Wyman  Mauldin

COLLEGE OF FOREST AND RECREATION RESOURCES
BENTON HOLCOMB BOX, Dean

BACHELOR OF SCIENCE
Forest Management

Albert Nelson Boles  West Columbia
Ronald Thomas Collins  Columbia
Eugene Estes Jennings  Chester
David Earl Jollay  Camden
***Robert Hugh Jones, Jr.  Honeoye Falls, N. Y.
James Louis Martelli  Woodbridge, N. J.
*Stewart Alexander McKenzie  Florence
Harold Bryan Odom, Jr.  Sumter
Steven William Oliver  Duncan
*Gary Nichols Shealy  Easley

Recreation and Park Administration

Colon Murray Abraham  Darlington
Catherine Betts Culp  Fort Mill
Cynthia Lee Hall  Poquoson, Va.
Carol Sarah Hansen  Syosset, N. Y.
Melinda Jane Hiers  Charleston
Kathryn Ann Hume  Union
Michael Joseph Lawrence  Liberty
*Mary Claire Myers  Oakway
Farley Malcolm Norton  Greenwood
Thomas Frank Qualters  Somerset, Pa.
*Susan Wright Shedd  Union
Barbara Anna Simpson  Clemson
*Robert Johnson Smith, Jr.  Mountain Home, N. C.
Thomas Norwood Stipe  Orlando, Fla.
John Davis Taylor  Batesburg
**Sally Dean Webb  Hartsville
Susan Leigh Wright  Aiken

COLLEGE OF INDUSTRIAL MANAGEMENT AND TEXTILE SCIENCE
WALLACE DABNEY TREVIILLIAN, Dean

BACHELOR OF ARTS
Economics

Robert Wesley Hamilton  Greenville
William Andrew Hoffmann  Greenville

BACHELOR OF SCIENCE
Accounting

John Franklin Fiedler  Little Silver, N. J.
James Edward Heck II  Callifon, N. J.
Snow Masters Port  Easley
Roy Edwin Simpson, Jr.  Hickory, N. C.
Administrative Management

Mary Anna Bennett ............... Jacksonville, Fla.
Larry Wallace Blackwell ............. Lancaster
Lisa Kathleen Burnett ............... Greenwood
Richard Rives Cayce ............... Towson, Md.
Gregory Neal Clary ............... Greenville
Steven Colin Cleveland ............... Anderson
Gregory Warren Coles .............. East Elmhurst, N. Y.
Mark Steven Cowan ............... Alexandria, Va.
Hugh Albert Dodd, Jr. ...... Spartanburg
Emmanuel Ozo Egede ............. Benin City, Bendel State, Nigeria

John Ronald Gangemi ........ Coral Gables, Fla.
Charles Glenn Garrett .......... Fountain Inn
Richard Barry Hair ............. Elkton, Md.
Brian Keith Holzberger ........ Greenville
Michael David Hunter ........ Greenville
Lou Geania Shaw Jacques .......... Santee
Kimberly Anne Landrum ........ Greenville
Mark Stephen Lewis .......... Greer
Charles Thurman Mason ........ Williamston
Thomas Dale Mason .......... Spartanburg

Economics

**Emmalyn Berrier Frye .......... Clemson
Robert Wilson Pridgen, Jr. .......... Kingstree

Financial Management

*Richard Franklin Bryant, Jr. ........ Hartsdale
Jack JeDon Hill ................ Beaufort
Joseph Michael Jordan .......... Conway
Jeffrey Deane McBee .......... New Ellenton

Industrial Management

John Miller Atwood ........ Greenville
Ralph Kent Bedenbaugh .......... Prosperity
John David Jones .......... Lancaster

Textile Science

*Anan Laothamatas .......... Bangkok, Thailand

BACHELOR OF TEXTILE TECHNOLOGY

Dennis Ray Adams .......... Anderson
Martin Andrew Lyons .......... Anderson
Taiwo Akanni Joshua Ogunjobi .... Ilesha, Oyo State, Nigeria

BACHELOR OF ARTS

English

***William James Cody .......... Spartanburg
Kim Fennell Ellenberg .......... West Pelzer

JOHN MARIE LEE OSOWAL .......... Hilton Head Island
Richard Dean Wilson .......... Easley

History

George Timothy Palmer .......... Estill

Modern Languages

Ernest James Morgan II .......... Anderson
Political Science
Brink Lee Hinson ........................ Chapin
Judith Patricia Kosbob ........................ Hohokus, N. J.
Kimberly Deane Peeler ........................ Dayton, Ohio
George Lawrence Rotann ........................ Florence

Victor Allan Sherlock ........................ Chevy Chase, Md.
Beatrice Ophelia Smith ........................ Anderson
Gregory Lee Smith ........................ Orangeburg

Psychology
*Joyce Anne Baird ........................ Spartanburg
***Lisa Gayle Brooks ........................ Charleston
*Joel Michael Cheek ........................ Anderson
Barry Wane Gleaton ........................ Orangeburg

*Deborah Lee Jackson ........................ Sylva, N. C.
Debbie Johnson ........................ Conway
Sharon Leann Mullinax ........................ Lyman

Sociology
Patricia Lee Buko ........................ Greenville
Vicki Lee Foxx ........................ Seneca
Patricia Lynn Green ........................ Inman

Phyllis Annette Owings ........................ Greenville
Susan Angela Thomas ........................ Greenville
James Russell Woodard ........................ Seneca

COLLEGE OF SCIENCES
HENRY ELLIOTT VOGEL, Dean

BACHELOR OF SCIENCE

Biochemistry
*Spence McLean Taylor ........................ Columbia

Botany
*James Joseph Cochran ........................ Oxon Hill, Md.
*Cynthia Gaertner Moore ........................ Nashville, Tenn.

Chemistry
Patricia Diane Flanders ........................ Beech Island
Henry Adrian Laskey ........................ Coral Gables, Fla.

Mathematical Sciences
Peter George Hudson ........................ Greenville

Medical Technology
**Anna Russell Bissell ........................ Pawley’s Island
Cathy Lynn Davis ........................ Anderson

*Shirley Anna Libb ........................ Simpsonville
*Nancy Goudelock Strawhorn ........................ Easley

Microbiology
Robert Bruce Culbertson ........................ Greenwood
*Cecil Bryan Jordan II ........................ St. George

***Brad Marshall Simpson ........................ Starr
John Michael Sullivan ........................ Winnsboro

Physics
*John Tony Kinard ........................ Newberry
Jerry Lee Konen ........................ Greenville

Pre-Professional Studies
*Johnny Yates Smith ........................ North Augusta

* With honor: A grade point ratio of 3.00 to 3.49
** With high honor: A grade point ratio of 3.50 to 3.79
*** With highest honor: A grade point ratio of 3.80 or above
† Senior division honors: The students so designated have earned a B or better in 12 credits of honors work at the upper division level, have a minimum GPR overall of 3.00, and have been recommended by their department or college.
Masters' and Education Specialists Degrees Conferred August 11, 1979

Arnold Edward Schwartz, Dean, Graduate School

College of Agricultural Sciences

Master of Agriculture
Frank Allen Hale Wilmington, Ohio

Master of Science
Agronomy
Elizabeth Moore Glenn Union

Horticulture
Lawrence Arthur Shepps Clemson

Nutrition
Deborah Arledge Mundell Greenville

Wildlife Biology
Michael James Hinton Simpsonville
William Senn McTeer Hampton

College of Architecture

Master of Architecture
Robert Warren Brenner Valley Stream, N.Y.

Master of City and Regional Planning
William Riley Godwin III Charleston
Barbara Jewell Jones Fredericksburg, Va.

Master of Fine Arts
Marcia Yvonne Bugg Sumter

College of Education

Education Specialist
Educational Administration
Joel James McAbee Ware Shoals

Master of Agricultural Education
(Agricultural Education is jointly administered by the College of Agricultural Sciences and the College of Education.)

Randall Ralph Cantrell Greenville
Henry Eddie McKnight Moncks Corner
James Talmadge Myers Lynchburg

Master of Education
Administration and Supervision
Clarence Truman Abrams Ware Shoals
Patricia June Ammons Greenville
Leonard Alvin Brown Greenville
Beverly Hipp Dickson Clemson
Jack Daniel Hill, Jr. Etowah, N.C.
Sally Culbreath Knight Greenwood
Larry Wayne Lawhorne Walhalla
Jerry Bennett Lesley Central
Edward Curtis Mobley, Jr. Anderson
Walter Martin Munro Atlanta, Ga.

John Conrad Park Greer
Greeta Granger Peden Pendleton
William Byron Reames Hanahan
Charles Edward Roache Williamston
John Randolph Scott Honea Path
Thomas Mancil Sumerel, Jr. Spartanburg
George Edward West Laurens
Annette Hattie Williams Greenwood
Lynn Lockaby Wilson Anderson
Elementary Education

Deborah Kay Aiken Greenville
Kathleen Gramling Alexander Anderson
Mable Stewart Alexander Seneca
Izetta Agnew Altman Anderson
Gail Young Anderson Piedmont
Curtis Elaine Bassett Easley
Anna Long Bedenbaugh Newberry
Sally Berry Silverstreet
Jean Lesslie Blakely Ora
Reba Dianne Boiter Piedmont
Henrietta Frances Bowers Ninety Six
Patsy Anne Brown Anderson
Linda Jacobs Browning Enoree
Deborah Ann Bruce Lugoff
Sandra Smith Bull Greenville
Rita Parris Burns Taylors
Kathryn Bryan Burris Laurens
DeLane Misenheimer Caldwell Greenwood
Jane Templeton Calhoun Greenwood
Nancy Camp Carter Westminster
Anita Kroger Creamer North Augusta
Mary Ann G. Culbertson Easley
Marilyn Anne Curtis Greenville
Fran Hall DiBiase Newberry
Donna Marie Drake Laurens
Elizabeth Joan Evans Six Mile
Elizabeth Austin Gramblin Easley
Debra Riddle Herbert Anderson
Trudy Force Hipp Newberry
Ruthia Ann Hodges Ware Shoals
Rebecca Bardin Holbert Cameron
Alzine Houser Santee
Linda Williams Hughes Easley
Mary Grogan Jenkins Anderson
Margie Ruble Johnston Greenville
Susan Couch Jones Williamston
Laura Welsh Keese Westminster
Sharon Gale Tackett Kennedy West Union
Sheila Taylor King Clemson
Pat Ivester Littleffield Greenville
Dohnia Graham McBride Seneca
Vickie Robinson McKinney Easley
Susan Mullikin McMillan Anderson
Jane Rankin McPhail Seneca
Pamela Vaughn Moon Greer
Gilda Rice Noblit Clemson
Wanda Malone O'Dell Ware Shoals
Thresa Ann Owens Greenville
Patricia Vaughn Parker Great Falls
Brenda Barton Parson Homea Path
Frances Gayle Patterson Anderson
Julie Evelyn Patton Greenville
Jacqueline Lathrop Perry Newberry
Debbie Jean Pruitt Anderson
Rebecca Scott Purcell Toccoa, Ga.
Elaine Sharpe Richey Due West
Charles Howard Roberts Liberty
Sarah Dowtin Robinson Greenwood
Paula Jean Seymour Easley
JeNelle Farmer Sheffield Westminster
Connie Morrow Sheppard Liberty
Diane Perry Sites Seneca
Barbara H. Smith Mauldin
Cecilia Beth Simpson Smith Belton
Elizabeth Jill Stroupe Greenville
Gene Bruce Thompson Greenville
Callie Darlene Tilley Anderson
Carolyn Ann Kinchen Trask Walhalla
Patricia Henderson Turmon Easley
Peggy Childs Vaught Toccoa, Ga.
Sherry Elaine Walden Moore
Catherine Virginia Watson Walhalla
Gayle Eloise Watson Greenville
Anita Ashley White Greenville
Linda Williams White Westminster
Joyce Young Norway

Personnel Services
Sheila Ragland Binger Central
Judith Bryson Oakway
Wayne Cecil Cain Westminster
Marion Virgil Cantrell, Jr. Greenville
Edna Hurt Chisenia Greenwood
Alene Ayer Crews Hampton
Linda Kay Edwards Greenwood
Mitzi Carol Fleming Anderson
Jeanne Colvin Florence Greenwood
Thomas Frank Gentry, Jr. Clemson
Lyons Alexander Hamblen, Jr. Rogersville, Tenn.
Linda Elaine Hewitt Pendleton
Wanda Lee Holley Greenwood
Mary Janice Boozer Meeks Newberry
Thomas Anthony O'Dare Spartanburg
Norma Jane Patterson Cherry Hill, N. J.
Anita Walker Reed Atlanta, Ga.
Bruce Layton Rogers Anderson
Zelphia Mae Shumate Greenville
Carolyn G. Simpson Walhalla
Elaine Cordelia Stevens Greenville
Frances Sargent Stewart Lyman

Reading
Mary Alice Barksdale Greenville
Lane McLendon Black Clemson
Deborah Green Cockcroft Beaufort
Darryl Allen Cook Greenville
Tana Kallenbach Crum Easley
Emilie Kelley Lesesne Due West
Gayle Goodman Lever Clemson
Sally Love Belton
Suzanne Marie Newton Charleston
Diane Margarette Ogle Clemson
Susan Taylor Reamer Greenville
Barbara F. Turner Greenville
Carol Ann Wyatt Newland, N. C.
Secondary Education

Kevin Howell Boutelle .......... Rapid City, S. D.  Ellen Stewart King .................... Anderson
Debbie Fallaw Curry ............ Gray Court  Elizabeth Ellen Lyman ............... Greenville
Nan Haddock Drew ................ Anderson  Jane Phibbs Rainey .................... Greenville
Judy Ann Fallaw .................. Clinton  Henry Smith Spann .................... Anderson
Roberta Long Garvin ............. Anderson  Lynn Murray Taylor .................. Anderson
Richard Norman June ............ Saratoga Springs, N. Y.  Jacqueline Butler Young .............. Greenville

MASTER OF INDUSTRIAL EDUCATION

DeBerry Hugh Blackwelder III .... Spartanburg  Greg Ritner McDowell .................. Miami, Fla.
Donald Bennett Campbell .......... Abbeville  Randal Brooks Miller ................... Holly Hill

COLLEGE OF ENGINEERING

MASTER OF ENGINEERING

Civil Engineering

Richard George Donoghue ....... Jacksonville, Fla.  Stuart Douglas Whiteside ............... Columbia

Environmental Systems Engineering

Michael Bailey Parker .......... Paulding, Ohio  Walton Thomas Rhodes ................. Camden
George Carey Patrick ............ Savannah, Ga.  Thomas Victor Thain III .............. Lexington

MASTER OF SCIENCE

Bioengineering

John Esrom Anderson ............. Temple Hills, Md.  Vimalkumar Haribhai Desai .......... Baroda, Gujarat, India
Dana R. Clarke .................... Pickens  Richard Coleman Taylor, Jr. .......... Lancaster

Ceramic Engineering

William Calvin Moore, Jr. ........ Anderson

Chemical Engineering

Jerome Francis Marra ............. Jamestown, N. Y.  Alan Douglas Mills ..................... Greenville

Civil Engineering

Bonny Anthony Alphonso ......... New Amsterdam, Guyana

Electrical Engineering

Vikram Kowshik ................. Dharwar, Karnataka, India  James William Strawhorn ............ Honea Path
Gurbir Singh ..................... Chandigarh, India

Engineering Mechanics

Robert Steven Gross ............. Clemson

Environmental Systems Engineering

Maria Julia Kogut ................ Krakow, Poland  Peter McClelland Wilson .......... Bearsden, Scotland
Tsun-Chia Ku ....................... Clemson

Mechanical Engineering

Walton Lane Ector, Jr. .......... Charleston  Jay Robert Smith ....................... Ada, Ohio
Keith Michael Hamlyn ............ Kennesaw, Ga.  Randall Perry Todd .................. Greenville

Systems Engineering

Saleem Shamshudin Hasham ........ Nairobi, Kenya
### COLLEGE OF FOREST AND RECREATION RESOURCES

**MASTER OF RECREATION AND PARK ADMINISTRATION**

<table>
<thead>
<tr>
<th>Name</th>
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<tr>
<td>Betty Joanne Baines</td>
<td>Gaffney</td>
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<td>John Freeman Bradberry</td>
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<tr>
<td>Glenn Robert Daly</td>
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<td>Lindsay Blanton Graham</td>
<td>Greenville</td>
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### COLLEGE OF INDUSTRIAL MANAGEMENT AND TEXTILE SCIENCE

**MASTER OF SCIENCE**

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<tbody>
<tr>
<td>Donna Hubler</td>
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<td>David Lynn Kelley</td>
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<td>Stephen John Marett</td>
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<td>Wade Dean Page</td>
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<td>Norman Milton Scarborough</td>
<td>Moncks Corner</td>
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<td>Venkatesh Veerubhotla Sharma</td>
<td>Hyderabad, India</td>
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<tr>
<td>Textile Chemistry</td>
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<tr>
<td>Thomas E. Davidson</td>
<td>Montoursville, Pa.</td>
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**Biology**

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<td>Edna Rose Richardson</td>
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<td>Margaret Ellen Sloan</td>
<td>Garfield, N. J.</td>
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**Mathematical Sciences**

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<tr>
<td>Anjani Hariprasad Patel</td>
<td>Houston, Texas</td>
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<td>Steven Bradley Tollison</td>
<td>Clemson</td>
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<tr>
<td>Maryanne Tsivitse</td>
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**Physics**

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<tr>
<td>Ronnie Jimmie Suggs</td>
<td>Hattiesburg, Miss.</td>
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**Zoology**

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<thead>
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<th>Name</th>
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<tr>
<td>Susan Sanders Frawley</td>
<td>Little Rock, Ark.</td>
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<tr>
<td>Toy Spotwood Poole</td>
<td>Charlotte, N. C.</td>
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### COLLEGE OF LIBERAL ARTS

**MASTER OF ARTS**

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<tr>
<td>Karen Edwards Alphonso</td>
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<tr>
<td>George Michael Donahue</td>
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<td>Martha Jones Faires</td>
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<td>Martha Bolding Findley</td>
<td>Pickens</td>
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<td>Judith Ann Groff</td>
<td>New Providence, N. J.</td>
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<td>Bobby Lee Hanley</td>
<td>Clemson</td>
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<td>Melba Doris Howard</td>
<td>Georgetown</td>
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<tr>
<td>Christine Ann Little</td>
<td>Rocky River, Ohio</td>
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<td>Rachel Smith Matzko</td>
<td>Greenville</td>
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<td>Thomas Michael Moyle</td>
<td>Columbia</td>
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<tr>
<td>Roger Patrick Pecoraro</td>
<td>New Orleans, La.</td>
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<tr>
<td>Lynne Austin Rhodes</td>
<td>Ellmore</td>
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<tr>
<td>Ann DuPre Todd</td>
<td>Camden</td>
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**History**

<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Nancy Torrance Matthews</td>
<td>Charleston</td>
</tr>
<tr>
<td>Walter Donald Wysocki</td>
<td>Annapolis, Md.</td>
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</tbody>
</table>

### COLLEGE OF NURSING

**MASTER OF SCIENCE**

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<thead>
<tr>
<th>Major</th>
<th>City, State</th>
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</thead>
<tbody>
<tr>
<td>Nursing</td>
<td>Caldwell, N. J.</td>
</tr>
<tr>
<td>Martha Woodward Forabrey</td>
<td>Caldwell, N. J.</td>
</tr>
</tbody>
</table>

### COLLEGE OF SCIENCES

**MASTER OF SCIENCE**

<table>
<thead>
<tr>
<th>Field</th>
<th>City, State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biochemistry</td>
<td>Aiken</td>
</tr>
<tr>
<td>Lewis Andy Litteral</td>
<td>Forest Park, Ga.</td>
</tr>
<tr>
<td>Botany</td>
<td></td>
</tr>
<tr>
<td>Edna Rose Richardson</td>
<td>Winston, Ga.</td>
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<td>Margaret Ellen Sloan</td>
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**Mathematical Sciences**

<table>
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<tr>
<th>Name</th>
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<tr>
<td>Myra Melissa Brock</td>
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<td>Clemson</td>
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<td>Solon, Ohio</td>
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</tbody>
</table>

**Microbiology**

<table>
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<th>Name</th>
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<tbody>
<tr>
<td>Ronnie Jimmie Suggs</td>
<td>Hattiesburg, Miss.</td>
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</table>

**Physics**

<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Susan Sanders Frawley</td>
<td>Little Rock, Ark.</td>
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</table>

**Zoology**

<table>
<thead>
<tr>
<th>Name</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Toy Spotwood Poole</td>
<td>Charlotte, N. C.</td>
</tr>
</tbody>
</table>
DOCTORS' DEGREES CONFERRED AUGUST 11, 1979
ARNOLD EDWARD SCHWARTZ, Dean, Graduate School

COLLEGE OF AGRICULTURAL SCIENCES

DOCTOR OF PHILOSOPHY
Applied Economics

B.S., M.A., University of South Carolina
Dissertation: Planning Higher Education: A Demand Induced Approach with Application to South Carolina

Tommy Cleveland Meadows .................................................... Franklin, N. C.
B.A., Asheville-Biltmore College; M.S., Clemson University
Dissertation: Population, Population Growth and Municipal Expenditures in South Carolina

COLLEGE OF ENGINEERING

DOCTOR OF PHILOSOPHY
Engineering

Haren Almaula ........................................................................ Surat, India
B.T., Indian Institute of Technology
Dissertation: A Method for the Transient Stability Enhancement of a Power System Using Feedback Control of a Synchronous Generator (Field of Specialization: Electrical Engineering)

Kailasam Satyamurthy ............................................................. Mayuram, Tamilnadu, India
B. Engr., Colmbatoreo Institute of Technology; M.S., Clemson University
Dissertation: Collapse Load Analysis for Plates and Panels (Field of Specialization: Engineering Mechanics)

Bobby Louis Tyson ................................................................. Athens, Ga.
B.S., M.S., University of Georgia
Dissertation: A Study of the Mechanical Strength of Pecan Shells (Field of Specialization: Agricultural Engineering)

COLLEGE OF INDUSTRIAL MANAGEMENT AND TEXTILE SCIENCE

DOCTOR OF PHILOSOPHY
Management Science

Charlie David Fiskeaux .......................................................... Clemson
B.S., University of Virginia; M.S., Clemson University
Dissertation: Tukey Smoothers as Preprocessors for Obtaining Robust Estimates of Arma Parameters

Hoke Smith Hill, Jr. ................................................................ Canon, Ga.
B.S., The Citadel; M.S., Clemson University
Dissertation: A Monte Carlo Study of AR(1) Estimators Under Several Performance Criteria

COLLEGE OF SCIENCES

DOCTOR OF PHILOSOPHY
Biochemistry

B.A., Maryville College; M.S., Clemson University
Dissertation: Polyphenol Oxidase in Peaches

Mathematical Sciences

Robert Boyd Allan ................................................................. Sebring, Fla.
B.A., University of South Florida; M.A., University of Georgia
Dissertation: On Domination and Some Related Topics in Graph Theory
Physics

Christian Leemann ........................................ Muralto, Switzerland
Diploma, Mathematics and Physics, Swiss Federal Institute of Technology, Zurich, Switzerland
Dissertation: Excess Noise in Bismuth Whiskers

Robert Henry Pezzell ....................................... Prospect Heights, Ill.
B.A., M.S., Wayne State University
Dissertation: An Extended Differential Analysis Technique for Determining DNA Mass Distribution

Zoology

Thomas Clinton Gore ......................................... Ft. Lauderdale, Fla.
B.S., Clemson University
Dissertation: Physiological Factors Affecting the Periodicity of Leucocytozoon Smithi Gametocytes in the Peripheral Blood of Domestic Turkeys
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BENTON HOLCOMB BOX, Dean
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Judson Arnold Alden .......................... Atlanta, Ga.
*Christine Mary Bardolf ...................... Clearwater, Fla.
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Mary McKimmon Winston ........................ Jacksonville, Fla.
### Administrative Management

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### Economics

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<td>James Alan Boggs</td>
<td>Walhalla</td>
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<td>Douglas William Dunn</td>
<td>Daytona Beach, Fla.</td>
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<td>Trescott Newton Hinton, Jr.</td>
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<td>Robert Edward Milhous</td>
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### Industrial Management

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<td>Terry Lamar Breland</td>
<td>Ruffin</td>
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<td>George Alfred Grieve</td>
<td>North Augusta</td>
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<tr>
<td>E. Preston Gulledge</td>
<td>Okeechobee, Fla.</td>
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<tr>
<td>William John Hesketh</td>
<td>Cortland, Ohio</td>
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<td>Charles Edward Hoy</td>
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<td>Richard Alan Spann</td>
<td>Port Washington, N. Y.</td>
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<td>Patricia Huggins Taylor</td>
<td>Myrtle Beach</td>
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<tr>
<td>Ronald Allen Wollaston</td>
<td>Hagerstown, Md.</td>
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### Textile Chemistry

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<td>Lee Francis Lemere</td>
<td>Walhalla</td>
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### Textile Science

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<tr>
<td>*Jack Thurman Larkins, Jr.</td>
<td>Rock Hill</td>
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### BACHELOR OF TEXTILE TECHNOLOGY

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<tr>
<td>***Jesse Harold Campbell</td>
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<tr>
<td>Michael Dean Patrick</td>
<td>Union</td>
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<td>*Roy Clyde Pepper</td>
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<tr>
<td>Alfred Henry Surratt, Jr.</td>
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COLLEGE OF LIBERAL ARTS
HEADLEY MORRIS COX, Dean

BACHELOR OF ARTS

English
**Harvey Steven Barr .............. Greenville
Margaret Karen Blackman .......... Calhoun Falls
*Myra Ferguson Cato ............. Albany, Ga.
*Angela Carol Elam .............. Columbia
Gerald Bruce Garrett ............. Six Mile

Donna Marie Harris ............ Elloree
Robert Bagwell Kephart .......... Anderson
James Malcolm McNair, Jr. ...... Aiken
*Kathleen Ann Morgan ........... Seneca
Cindy Rae Young ............... Mauldin

Modern Languages
***Laura Jeanne New ............. Aiken
**Susan Jane Rivell ............. Oldwick, N. J.

Linda Sue Stegall ............. Greenville

Political Science
Scott Bryan Barrows ............. Weathersfield, Conn.
Bruce Wayne Cooley ............. Pelzer
Gregory Ellis Dobson .......... Greer
Joseph Arnold Erwin .......... Greenville
Philip Lester Furr ............. High Point, N. C.
Sara Suzanne Hennes ............ Anderson

Ralph Edward Hilsman .......... Greensboro, N. C.
Stewart Comer Kidd, Jr. ....... West Caldwell, N. J.
Beth Ellen Tutan ............... Coral Gables, Fla.
*Evan Angelos Vutsinas ........ Clinton, Maryland
*Leslie Jean Wade ............... Charleston

Psychology
*Jeffery Zoltion Agardy ........ Greenwood
*Clarence Hal Freeman .......... Williamson
*Emily Ann Galloway .......... Darlington
*Vera Susan Garrett .......... Travelers Rest
Karen Ann Grogan .............. Columbia
***Helen Lenora Hardee .......... Loris
Susan Lois Hertzberg ......... Clemson

Ruth Jennings Jordan .......... Columbia
Kim Anita Lacey ............... Clemson
*LeeAnne Lewis ................. Rock Hill
*Elizabeth Varn Moore .......... Orangeburg
*Laurie Hollace Sox ............ Cayce
*Kathy Joan Trevorrow .......... Pittstown, N. J.
Barry Steven Wall ............. Charleston

Sociology
James Albert Cox .............. West Pelzer
*Carol Wimberly Hellinger ....... Orlando, Fla.
*Mary Martin Lea ............... Corinth, Miss.

Claire Edmondston Plowden ....... Columbia
*Sharon Leigh Staley ........... Winston-Salem, N. C.
Wanda Lynn Watson ........... Batesburg

COLLEGE OF NURSING
GERALDINE LABECKI, Dean

ASSOCIATE IN ARTS
Nursing
Helen Seymore Fennell ............ Anderson

COLLEGE OF SCIENCES
HENRY ELLIOTT VOGEL, Dean

BACHELOR OF ARTS
Chemistry
Robert Meredith Smith ............. Six Mile

Mathematical Sciences
Hattie Pearl Hall ............... Anderson
BACHELOR OF SCIENCE

Biochemistry

***Anne Prothro Goldsmith         Manning                      Columbia

*John Sanchelli, Jr.               Columbia

Botany

Martha Pritchard Darr             Wadsworth, Ohio

Chemistry

*Charles David Harrill            Greer                         Fulton, N. Y.

David Leon Stuber                 Fulton, N. Y.

Mathematical Sciences

*Janis Faye Cox                   Belton                       Greenville

Mark Alan Schafer                 Greenville

*John Allen McMillan              Spartanburg                   Gaffney

Elizabeth Ann Smiley              Gaffney

Mark Stephen Perry                Anderson                      Blackville

**Kenneth Allan Suman             Blackville

Medical Technology

Georgette Smith Fennell           Columbia

Microbiology

Rebecca Meiggs Livings Armes      Columbia

**Catherine Ellis Birch           Wilmington, Del.

Stephen Robert Chabek             Anderson

Karl Ralph Deily                   Aiken

*William Charles Hall, Jr.        Beaufort

**Flena Christine Hopkins         Florence

***Stuart Harris Janousky          Charleston

*Stephen Franklin Linder           Charleston

**Filmon Mack Sexton, Jr.         Mt. Pleasant

PRE-PROFESSIONAL STUDIES

*Jeffery Louis Beacham            Taylors

Dale Elizabeth Whitlaw Bridges    North Augusta

Thomas Alan Grogan                Westminster

Steven Clark Grumman              Florence

Alan David Perlitz                Charleston

Kenneth William Royce             Liberty

Dennis George Widner              Columbia

* With honor: A grade point ratio of 3.00 to 3.49

** With high honor: A grade point ratio of 3.50 to 3.79

*** With highest honor: A grade point ratio of 3.80 or above

† Senior division honors: The students so designated have earned a B or better in 12 credits of honors work at the upper division level, have a minimum GPR overall of 3.00, and have been recommended by their department or college.
MASTERS' AND EDUCATION SPECIALISTS DEGREES CONFERRED DECEMBER 20, 1979

ARNOLD EDWARD SCHWARTZ, Dean, Graduate School

COLLEGE OF AGRICULTURAL SCIENCES

MASTER OF AGRICULTURE

Gary Lee Burns .......................... Robbins, N. C.  
Thermon Eugene Hall ..................... Batesburg  
Robert Dean Halman ...................... Waycross, Ga.  
Louis Cornelius Hearn ................... Laurinburg, N. C.  

Steven Lamar Long ........................ Columbia  
Kenneth DeVore Parkman .................. Saluda  
Luke Eldon Reese .......................... Taylorsville, N. C. 
Dale Edwin Robertson ..................... Pine Hall, N. C.

MASTER OF NUTRITIONAL SCIENCES

Kimberly Anne Bell ....................... Newburgh, N. Y. 

Jodee Lynn Meisenhelder ................. Charleston

MASTER OF SCIENCE

Agricultural Economics

James Harold Babb ......................... Gaffney  
Kathy Cotman Lambert ..................... Hopewell, Va.

Barbara Claffey Prinzinger ............... Central

Agronomy

Roger Allen Jones ......................... Poughkeepsie, N. Y.

Animal and Food Industries

Mario DeLuca ............................. Ft. Myers, Fla.  
Krista Frane Hawkins .................... Summerville  
Steven Leslie Milliken .................... Harrisburg, Pa.

William David Resseguie ................. Tar Heel, N. C.  
Louise Wicker ............................ Pomaria

Horticulture

Patsy Fenters O'Connor .................. Charleston

Nutrition

Si-Yin Chung ............................. Hong Kong  

Robert Nathan Greene ..................... Bennettsville

Wildlife Biology


Robert Daniel Perry ....................... Kershaw

COLLEGE OF ARCHITECTURE

MASTER OF ARCHITECTURE

James Allen Binger ......................... Clemson  
James Carl Hambright III .................. Rock Hill  
Jeffrey Bennett Lazarus ................... Stamford, Conn.

Wade Hampton Macfie ...................... Winnsboro  
William Poole Mann ......................... Greenville

MASTER OF CITY AND REGIONAL PLANNING

Kevin Marshall Crown ...................... Gaithersburg, Md.  
Philip Dew England ....................... Pendleton  
Yvette Richardson Guy ..................... Georgetown

Yuen-Yee Pong ............................. Hong Kong  
Mindy Rochelle Wittenberg ................. Sumter

MASTER OF FINE ARTS

Bobby Lee Brown .......................... Charleston  
Alan Clark MacTaggart ..................... Greenwood

Edward Zimmerman Wimberly .............. St. Matthews

COLLEGE OF EDUCATION

EDUCATION SPECIALIST

Educational Administration

Boyden Lawrence Brown, Jr. ................ Newberry  
Troy Edward Hawkins ...................... Seneca  
John Henry Hostetler ...................... Walhalla  
Amos Hykes ............................... Greenville  
Gary Wendell Looper ...................... Pickens

Thomas Myron McClain ..................... Toccoa, Ga.  
Harold Oscar Mims, Jr. ................... Greenville  
Robert Mitchell .......................... Greenville  
Jacquelyne Zorine Pilo .................... Seneca
MASTER OF AGRICULTURAL EDUCATION
(Agricultural Education is jointly administered by the College of Agricultural Sciences and the College of Education.)

Paul William Corley .................................................. Saluda
Bruce Allison Fox .................................................. Travelers Rest

MASTER OF EDUCATION

Administration and Supervision

Denise Hicks Grant .................................................. Danbury, Conn.
Willie Roscoe Jenkins .................................................. Westminster
Eleanor Miller Pletta .................................................. Seneca

Judy Carol Putnam .................................................. Greenville
Linvil B. Rich .................................................. Six Mile
Sherrill Ann O. Sims .................................................. Central

Elementary Education

Patricia Lea Bailey .................................................. Laurens
Sheri Costa Belk .................................................. Clemson
Sharon Gault Benston .................................................. Greenville
Carolyn Greenway Bishop ............................................ Anderson
Daisy Adair Blake .................................................. Greenville
Patricia Cox Brock .................................................. Clinton
Susan Milford Childs .................................................. Lavonia, Ga.
Barbara Virginia Crowder .......................................... Mountville
Deborah Skinner Cumbie ............................................. Central
Janice Amelia Dominy ............................................... Rincon, Kansas
Janette Ponder Dotson ............................................... Birmingham, Ala.
Carolyn Hudson Ellenburg .......................................... Walhalla
Freda Amanda Folk .................................................. Greenville
Sheryn Denise Garrett ............................................... Laurens
Jane Young Graham .................................................. Newberry
Julius Garry Green .................................................. Greenville
Janice Vernecia Hill .................................................. Simpsonville
Debra Lusk Hodges .................................................. Greenwood
Kathy Elizabeth Holt .................................................. Simpsonville

Sue Carole Hunter .................................................. Laurens
Loretta Joan Landreth ............................................... Westminster
Nancy Mutter Lenny .................................................. Piedmont
Beverly Holmes Lewis ............................................... Anderson
Evelyn Johnson Neal .................................................. Irmo
Gloria McKittrick Owens ............................................ Kinards
Gay Bennett Pappas .................................................. Seneca
Cathy Diane Pool .................................................. Clemson
Gloria White Porter .................................................. Oak Ridge Tenn.
Catherine Curtan Richardson .................................... Clemson
Julia Carter Screws .................................................. Pendleton
Beverly Jones Simmons ............................................. Anderson
Lottie Lee Smith .................................................. Anderson
Jennifer Lynn Tedder ............................................... Spartanburg
Dale Fowler Terry .................................................. Charleston
Valerie Arden Turner ............................................... Pendleton
Kenneth Harry Weichel ............................................ Clemson
Elizabeth Carole Perry Wham ..................................... Fountain Inn
Patricia Ann Worthington ......................................... Greenwood

Personnel Services

Irene Hollis Adair .................................................. Clinton
Dorothy Robinson Barnes ............................................ Clinton
Philip Gregory Blanton .............................................. Spartanburg
Susan Bradley Bowling ............................................... Whitmire
John Robert Brock, Jr. ............................................. Walhalla
Wanda Spears Clark .................................................. Clemson
John Allen Connell .................................................. Clemson
Victoria Lynn Ellison ............................................... Greenville
Eileen Ecklund Gorlo .................................................. Greenwood

Corrina Ballentine Johnson ........................................ Greenwood
Marcia Mitchell Langston ........................................... Seneca
Ruby Myers Nichols ............................................... Simpsonville
Linda Harris Stansell ............................................... Taylors
Fred Kemper Taylor ............................................... Clinton
Robert Curtis Tugwell ............................................... Easley
Carolyn Mitchell Warlick .......................................... Greenville
Susan Lynnette Zeigler ............................................. Fairfax

Reading

Rebecca McGee Hood ............................................... Easley

Secondary Education

Charles Lee Reichert ............................................... Greenville
Laura Ellison Robinson .............................................. Lancaster

MASTER OF INDUSTRIAL EDUCATION

Kenneth Malcolm Goforth .......................................... Anderson
Jerry Dean Steadman ............................................... Chesnee

Philip David Weinsier ............................................. Orlando, Fla.

COLLEGE OF ENGINEERING

MASTER OF ENGINEERING

Electrical Engineering

George Eliades .................................................. Katerini, Greece
Paul Wojnowiak .................................................. Douglasville, Ga.

Environmental Systems Engineering

Steven Ray Bowen .................................................. Easley

David Stanley Tarnowski ........................................... Clinton, N. Y.

MASTER OF SCIENCE

Bioengineering

George Elmore Gratick ............................................. Charleston
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<th>Program</th>
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<tr>
<td>Ceramic Engineering</td>
<td>Alan Corbett Ferguson</td>
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<td>Janice Lisette Lyons</td>
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**COLLEGE OF FOREST AND RECREATION RESOURCES**

**MASTER OF RECREATION AND PARK ADMINISTRATION**

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**MASTER OF SCIENCE**

**Forestry**

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<td>Marvin Wayne Nance</td>
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**COLLEGE OF INDUSTRIAL MANAGEMENT AND TEXTILE SCIENCE**

**MASTER OF SCIENCE**

**Textile Chemistry**

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<tr>
<td>Selby Mercer Brannon</td>
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**Textile Science**

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<tr>
<td>Sylvia Wei-Ling Ki</td>
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**COLLEGE OF LIBERAL ARTS**

**MASTER OF ARTS**

**English**

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<td>Laurie Louise Gunn</td>
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**History**

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<td>Patricia Kay Perry</td>
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COLLEGE OF NURSING

MASTER OF SCIENCE

Nursing
Corinne Crockett Harmon Anderson
Karen Phillips Saxton Taylors
Cathy Summers Heriot Columbia

COLLEGE OF SCIENCES

MASTER OF SCIENCE

Biochemistry
Marlena Hope Pinner Jonesboro, Ind.

Botany
Mark Gregory Dykes Greer

Mathematical Sciences
Yeu-Hsiung Liang Feng-Shan, Taiwan
Angela Paris McClain Iva

Zoology
David Alan Drumheller Pottstown, Pa.
Catherine Cameron Nestler Waycross, Ga.
Robert William Kelley Silver Spring, Md.
DOCTORS' DEGREES CONFERRED DECEMBER 20, 1979
ARNOLD EDWARD SCHWARTZ, Dean, Graduate School

COLLEGE OF AGRICULTURAL SCIENCES
DOCTOR OF PHILOSOPHY
Applied Economics

Henry Vance Young, Jr. ................................................... Camden
B.S., M.Ag., Clemson University

Animal Physiology

Lamar Talley Blankenship ........................................... Rome, Ga.
B.A., B.S., Shorter College
Dissertation: Hormonal Control of Bovine Uterine Endometrial Sex Steroid Receptors and Mycotoxin Interaction with Uterine Receptors

Entomology

Walker Alexander Jones, Jr. ........................................... Greenville, Miss.
B.A., University of Mississippi; M.S., Clemson University
Dissertation: The Distribution and Ecology of Pentatomid Pests of Soybeans in South Carolina

Plant Pathology

Ernest Grey Lawrence, Jr. ........................................... Mt. Airy, N. C.
B.S., Greensboro College; M.S., Clemson University
Dissertation: Epidemiology and Control of Cladosporium carpophilum on Peach

COLLEGE OF INDUSTRIAL MANAGEMENT AND TEXTILE SCIENCE
DOCTOR OF PHILOSOPHY
Engineering Management

Dwight Wilson Polk ................................................... Charleston
B.S., M.S., Clemson University
Dissertation: A Discriminant Analysis of Pilot Performance Prediction and Selection for Air-to-Air Combat

Textile and Polymer Science

Robert Clifford Brannon ............................................ Spartanburg
B.S., Wofford College; M.S., Clemson University
Dissertation: The Development of an Integrated Intensity Technique and Its Application in Determining the Crystal Structure of Fibrous Materials

Jack Anderson Dellinger ............................................ Clemson
B.S., Western Carolina University; M.S., Clemson University
Dissertation: Photodegradation and Luminescence Properties of Poly(ethylene Terephthalate-co-4, 4'-Bi-phenyldicarboxylate)

COLLEGE OF SCIENCES
DOCTOR OF PHILOSOPHY
Biochemistry

Michael Bruce Cable ................................................... Canton, N. C.
B.S., M.S., Western Carolina University
Dissertation: The Synthesis of a Stereospecifically Spin-Labeled Analogue of Cardiolipin and Its Interaction with the Membrane-Bound Enzyme Cytochrome c Oxidase
Chemistry

James Edward Leibner ............................................. Clemson
B.S., David Lipscomb College
Dissertation: Charged Micelle Size and Shape and 2H NMR Determination of Viscosity

William Erastus Swain, Jr. ............................................ New Bern, N. C.
B.S., North Carolina State University; M.S., East Carolina University
Dissertation: The Conformation of Certain Bicyclic Enones

Physics

William Clarence Maddox .......................................... Honea Path
B.S., M.S., Clemson University
Dissertation: Observations and Analyses of Four Eclipsing Binary Systems

Everette Lee Thompson .............................................. Memphis, Tenn.
B.S., Memphis State University; M.S., Clemson University
## DEGREES AWARDED BY MAJOR COURSES, 1978-79

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MASTERS'
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Agricultural Education, 179
Agricultural Engineering, 48
Agriculture, 99
Agronomy, 51
Animal and Food Industries, 3
Animal Science, 48
Architecture, 155
Bacteriology, 6
Biochemistry, 18
Bioengineering, 53
Botany, 20
Business Administration, 213
Ceramic Engineering, 90
Chemical Engineering, 83
Chemistry, 120
City and Regional Planning, 51
Civil Engineering, 102
Dairy Science, 36
Economics, 1,325
Education
Administration and Supervision, 226
Elementary Education, 690
Personnel Services, 405
Reading, 217
Secondary Education, 146

Education Specialist, 61
Electrical Engineering, 111
Engineering, 116
Engineering Mechanics, 16
English, 128
Entomology, 101
Environmental Systems Engineering, 104
Fine Arts, 18
Forestry, 51
History, 24
Horticulture, 95
Industrial Education, 169
Industrial Management, 36
Management, 105
Materials Engineering, 8
Mathematical Sciences, 78
Mathematics, 170
Mechanical Engineering, 119
Microbiology, 62
Nuclear Science, 3
Nursing, 12
Nutrition, 23
Nurtional Science, 25
Physics, 90
Plant Pathology, 25
Plant Physiology, 2
Poultry Science, 27
Recreational Park Administration, 65
Systems Engineering, 27
Textile Chemistry, 67
Textile Industrial Education, 1
Textile Science, 38
Textile Water Resources Engineering, 52
Wildlife Biology, 39
Zoology, 107

DOCTORS'
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Agricultural Engineering, 8
Agronomy, 15
Animal Physiology, 19
Applied Economics, 9
Biochemistry, 1
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Chemistry, 87
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Electrical Engineering, 22
Engineering Management, 25
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Entomology, 48
Environmental Systems Engineering, 17
Management Science, 9
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Systems Engineering, 6
Textile and Polymer Science, 10
Water Resources Engineering, 1
Zoology, 19

Total Degrees Awarded, 42,277
## ENROLLMENT BY COURSES AND ACADEMIC CLASSIFICATION

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**Note:** The abridged representation above captures a significant portion of the original text, focusing on the names, statuses, courses, and classes listed in the document. Due to the nature of the extracted data, it may not include every single entry from the source document, primarily focusing on the most populated fields within the table.
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SMITH MARK ALAN 4 M E 08
SMITH MARK L 4 M E 03
SMITH MARY ANGELA 4 ENGL 03
SMITH MARY K 4 M E 08
SMITH NANCY KAM 4 FIN MGT 02
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SMITH JULIE FRANCES 4 FIN MGT 02
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SMITH NANCY RAY 4 HLDSC 05
SMITH PAMELA 6 ADM MGT 05
SMITH PATRICIA C 6 NUTR 11
SMITH PATRICK MELVIN 4 M E 03
SMITH PEGGY DARLENE 4 R P A 05
SMITH RANDALL KILLE 1 ADM MGT 01
SMITH REGINALD K 6 PER A #11
SMITH RICHARD L 6 M I 01
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SMITH ROBERT M 6 CM BS #08
SMITH ROBIN LEE 4 SOC 03
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SMITH RONALD W 6 ASKUN 11
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SMITH RIVER LEE JR 4 ZOOL 07
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SMITH SANDRA JANE 4 NURS BS 06
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SMITH STEPHEN MOORE 4 MICRO 03
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SMITH TERRY MOORIS 1 ADM MGT 01
SMITH THOMAS NEWBART 5 ED-MA 05
SMITH VICKI LYNEE 4 EL ED 06
SMITH VIOLET JANE 4 NURS BS 03
SMITH VESTINA M 6 CM BS 11
SMITH WAYLAND JR 4 R P A 04
SMITH Wm JEFFERSON 4 R P A 03
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WALSH MARVIN W 2 AG-NO 11
WATKINS ARTHUR A 4 S ED 08
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WELCH BARBARA THOMAS 7 EDUC-NO 11
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WICKER EMETT EDWIN 7 EL ED 11
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WILLSON AMERNA M 5 AG-NO 11
WILSON CAROL ELAINE 4 AN SC 08
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YOUNG JOYCE 6 EL ED 11
YOUNG VERA HORTIC 5 AG-NO 11
ZEMR MARY MCmillin 5 AG-NO 11
students Enrolled in Off-Cairpus Courses, Fall Sanester, 1979

NAME

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CLASS

COURSE

ADAIR CARROLL DALE
ADAIR IRENE HOLLIS
ADAMS DAVID H
ADAMS DORIS MCriRIDE
ADAMS ELLA RUTH C
ADDISON RANDALL F
ADKJNS KAThERINE G
ALEXANDER JEAN aOOD
ALEXANDER MARION M
ALLEN ELIZABETH W
ALLEN JOYCE LOUISE
ALLEN NANCY REBEKAH
ALVEKSUN JAMES L JR
ANDERSON CAROLYN WMS
ANDERSON DEBORAH A
ANDERSON ROGER N SR
ASHLEY PHILLIP SAXON
ATKINS ROBERT ELSON
AYERS DEBORAH LYNN
BABB MARY F
BAILEY CHERYL ISLEY
BAKER ALICE MARIE
BAKER BETTY HARRJSON
BALLARD DEBRA ELAINE
BANKS KAREN STUART
BANNISTER LULA
BAR(iIOL MIRINDA H
BARNES JUDITH JESSUP
BARRETT PATRICIA P
BARklNEAU DAVID K
BATES JUDY TIMMERMAN
BATES SARA PRICHARD
BATSON STEPHEN M
BAUCOM KAY JOHNS
BAXTER MARCIA S
BAXTER PHILIP M
BEASLEY SARAH C
BECK ELEANOR TAYLOR
BELCHER ANTHONY
BELL CATHERINf T
BELL JAMES M
BELL KIMBERLY ANNE
BFLLJNGER SUSAN M
BENJAMIN ROSEMARY
BENNETT CAROL BROOKS
BENNETT CAROLYN
BENSTON SHARON GAULT
BENTON CARLEEN LANE
BERTOLINI SUZANNE A
BESSENT DALt PETTY
BEVILL LIILIAN M
BISHOP CAROLYN G
BISHOP LYNN PELHAM
BLACK PAUL BRYAN
BLAIR CORA KEMP
BOLDEN JOE MELVIN
BOLLING FRANCES G
BOLT JOYCE SPENCER
BONNETTE HENRY H JR
80STIC MAMIE GREENE
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BOl^EN STEVEN RAY
BOWERS ROSEWArY K
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BOYLE SALLY ROGERS
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BRADY JENNY FARRAR
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BRIDGES LINDA TAYLOR
BROCK PATRICIA COX
BROOKS JUDY COOK
BROWN BEVERLY A
BROwN DIANE PORTER
BROwN DOROTHY H
BROWN EDMONTA T
BROWN ETHEL LULA MAE
BROWN JEAN M
BROwN KATHLEEN w
BROWN MYRA KIRKLANO
BROWNING LINDA J
BRYANT CARLYLE R
BRYANT KAREN JOYCE
8UDDIN DWAN SUGGS
BULL RUBYE SMITH
BURCH JEAN R
BURNS JUDITH AYER
BURROUGHS WILLIS H
BURTON GEORGIA L
BUSBY MARY GNAUCK
8USSELL SUSAN SCOTT
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COURSE

BUZZELL DAVID REAu
BYERS JANE CARROLL
BYRD ANNE TUCKER
BYRD DOROTHY E
CALDWELL ANNIE AYERS
CALDWELL JERRY C
CALDWELL JOHN WM
CALDWELL LEILA M
CALLIHAM SANDRA D
CAMP BETTY PARSON
CAMPBELL JOANNE C
CAMPBELL MARY LOU
CAMPBELL MAXINE H
CANADY JEAN ANDERSON
CANTRELL MARION V JR
CAPE DEBORAH CLEMfJNS
CARGILL ANNE CROMER
CARPENTER ROBERT A
CARR LAURA LEE GREEN
CARR WILLIAM; CHARLES
CARROLL MICHAEL E
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CARTER SADLER NEELY
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caughman anne hentz
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chapping anne richey
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CLARKE CECILIA MARY
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CLEVELAND JAMES h
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COBLE VIRGINIA E
COCHRAN MARGARET P
COLE CAROLE CLAMP
COLEMAN BETTY WISE
COLEMAN TERRI
COOK BARBARA PHELPS
COOKE JAMES LELAND
CORLEY PAUL WM JR
CORUNTZES NANCY B
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CURTIS NANCY HOGSED
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DARBY PHILLIP EUGENE
DAVIS JUDY JORDAN
DAVIS MARIAN ELAINE
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DAVIS RICHARD T
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WALLACE DOLLY BAKER  5  EDUC-ND  11
WALLACE EASTER EPPIPS  5  AG-ND  11
WALLEN MARGARET H  6  EL ED  11
WALSH JOHN E  Jr  5  AG-ND  11
WALTER JOSEPHINE S  5  AG-ND  11
WALTER WEBBEKAH MILL  5  EDUC-ND  11
WALTON DAVID LEE  7  PER S  11
WARD GENEVA LYN H  5  EDUC-ND  11
WARE JOYCE ELLIS  7  EDUC-ND  11
WARMER CLAIR  7  EDUC-ND  11
WASHINGTON BERTHA M  5  EDUC-ND  11
WASHINGTON SAMUEL M  6  EDUC-ND  11
WASHINGTON ANNE WEAVER  6  EDUC-ND  11
WATSON AUDY MAF  6  EDUC-ND  11
WATSON PHONDA E  7  EDUC-ND  11
WATTS VERONICA W  5  EDUC-ND  11
WATTS VLADIE M BAILEY  7  S ED-MA  11
WEBB DEBORAH EDNA  7  EDUC-ND  11
WEBB DEBRA CLARKE  7  EDUC-ND  11
WEBB SUSANNE G  5  EDUC-ND  11
WELLS MARY C  6  EDUC-ND  11
WELNOE BELLE  6  EDUC-ND  11
WEST ALANE DUNCAN  7  EDUC-ND  11
WESTON DARRELL  5  AG-ND  11
WHITE ANNIE MICKLIN  7  EDUC-ND  11
WHITE EVELYN SMITH  6  NURS BS  11
WHITE FRANK A JR  5  EDUC-ND  11
WHITE KYM HOUSE  5  EDUC-ND  11
WHITE PHYLIP S  5  EDUC-ND  11
WHITEMEIER KATHY P  7  EDUC-ND  11
WHITEMORE GEORGE  7  EDUC-ND  11