1983

1983-1985 Catalog

University of Alabama in Huntsville

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UAH Catalog
1983-1985
The University of Alabama in Huntsville is an equal opportunity/affirmative action institution and does not discriminate with respect to race, color, religion, sex, age, national origin, or handicap status in any educational program or activity.

This catalog intends to reflect information current at the time of publication about the facilities, programs, requirements, regulations and fees of the University of Alabama in Huntsville. Students enrolling in the university are subject to the provisions stated herein. Changes may be made, however, with respect to such information and provision by the university at any time and without advance notice.
Class Periods

Monday, Wednesday, Friday

<table>
<thead>
<tr>
<th>Period</th>
<th>Time</th>
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<tbody>
<tr>
<td>A</td>
<td>8:00 a.m.- 9:15 a.m.</td>
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<tr>
<td>B</td>
<td>9:25 a.m.-10:40 a.m.</td>
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<td>C</td>
<td>10:50 a.m.-12:05 p.m.</td>
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<td>D</td>
<td>12:15 p.m.-1:30 p.m.</td>
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<td>F</td>
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<td>G</td>
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<td>H</td>
<td>4:35 p.m.-5:50 p.m.</td>
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<tr>
<td>R</td>
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<td>S</td>
<td>6:00 p.m.-8:00 p.m. (MW only)</td>
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<td>T</td>
<td>8:10 p.m.-10:10 p.m. (MW only)</td>
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Tuesday, Thursday

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<td>P</td>
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<td>Q</td>
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The UAH Term System

UAH has four identical terms, each spanning twelve weeks. Credit for course work is granted in standard semester-hour units.

General Information Center

The General Information Center located in the lobby of Morton Hall is available to all students, prospective students, and the public to obtain information about the University of Alabama in Huntsville.
# The University of Alabama in Huntsville
## Academic Calendar
### 1983-1984

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<th>SUMMER</th>
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<td>13 14 15 16 17/A 18 19</td>
<td>12 13 14 15 16 17 18 19</td>
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- **A** - Application Deadline
- **B** - Beginning of Classes
- **C** - Commencement
- **E** - Examinations
- **N** - No Classes
- **R** - Registration
- **S** - Study Day
Academic Calendar 1983-84

Fall Term
Early Registration .................................................. July 7-20
Placement Tests .......................................................... June 9, July 7, Aug 11
Application Deadline .................................................. August 15
Registration .............................................................. September 1
Holiday .............................................................. September 5
Classes Begin - 8:00 a.m. .............................................. September 6
Late Registration .......................................................... September 6 & 7
Deferred Exams (Summer Term) ........................................ September 10
Study Day .............................................................. November 15
Examinations ............................................................. November 16 - 19
Last Day Fall Term ........................................................ November 19

Winter Term
Early Registration .................................................. October 6 - 19
Placement Tests .......................................................... November 3
Application Deadline .................................................. November 10
Thanksgiving Holidays ................................................ November 24 & 25
Registration .............................................................. December 1
Commencement ............................................................ December 3
Classes Begin - 8:00 a.m. .............................................. December 5
Late Registration .......................................................... December 5 & 6
Deferred Exams (Fall Term) ............................................. December 10
Student Christmas Holidays ........................................... December 19 - 30
Classes Resume - 8:00 a.m. ........................................... January 2
Examinations ............................................................. February 27 - March 1
Last Day Winter Term .................................................... March 1

Spring Term
Early Registration .................................................. January 19 - Feb 1
Placement Tests .......................................................... February 9
Application Deadline .................................................. February 23
Holiday .............................................................. March 12 - 14
Registration .............................................................. March 15
Classes Begin - 8:00 a.m. .............................................. March 19
Late Registration .......................................................... March 19 & 20
Deferred Examinations (Winter Term) ................................ March 24
Examinations ............................................................. May 28 - 31
Last Day Spring Term .................................................... May 31
Commencement ............................................................. June 3

Summer Term
Early Registration .................................................. April 19 - May 2
Placement Tests .......................................................... May 10
Application Deadline .................................................. May 17
Registration .............................................................. June 7
Classes Begin - 8:00 a.m. .............................................. June 11
Late Registration .......................................................... June 11 & 12
Deferred Examinations (Spring Term) ................................ June 16
Holiday .............................................................. August 21
Study Day .............................................................. August 4
Examinations ............................................................. August 22 - 25
Last Day Summer Term .................................................. August 25
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<tr>
<td>ACT—American College Testing Program</td>
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<td>AOC—Area of Concentration</td>
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<td>AP—Advanced Placement Program</td>
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<td>CLEP—College Level Examination Program</td>
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<td>DCE—Division of Continuing Education</td>
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<td>EOC—Educational Opportunity Center</td>
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<td>ETS—Educational Testing Service</td>
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<td>FFS—Family Financial Statement</td>
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<td>GED—General Educational Development Testing Program</td>
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<td>GER—General Education Requirements</td>
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<td>GPA—Grade Point Average</td>
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<td>GRE—Graduate Record Examination</td>
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<td>IPG—Irregular Postgraduate</td>
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<td>LSAT—Law School Admissions Test</td>
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<td>MAT—Miller Analogies Test</td>
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<td>MCAT—Medical College Admissions Test</td>
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<tr>
<td>NEAS—National Engineering Aptitude Search</td>
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<tr>
<td>NTE—National Teacher Examination</td>
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<tr>
<td>QPA—Quality Point Average</td>
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<td>SER—Student Eligibility Rating</td>
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<td>TOEFL—Test of English as a Foreign Language</td>
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The University of Alabama in Huntsville is dedicated to the intellectual, aesthetic, social, technological, and economic advancement of the state and region it serves and is a competent member of the national and international academic communities. Such membership requires constant attention to teaching, research, and interaction with local, state, and regional communities. It demands a steady allegiance to academic values, an atmosphere conducive to the unhindered pursuit of knowledge, and the education of students as thinking individuals. Basic to the establishment and maintenance of its identity as a true university is a strong program in the liberal arts and sciences, which continues to form the core of education. This institution intends to expand its programs by pursuing the special advantages of its environment.

Its location in the midst of an important government and industrial research center gives it unusual opportunities for new and creative programs in engineering and natural sciences. Huntsville, a city which has peacefully managed drastic social and economic changes, also offers a rich field of discovery in social sciences. Because many citizens in this area have well developed cultural interests and talents, the university is encouraged to provide exceptional programs in the humanities.

In the development of these programs, the university is incorporating new academic disciplines, enriching traditional studies, and creating fresh academic approaches as faculty and students concentrate on the vastly complex problems of contemporary life.
General Information

The University of Alabama in Huntsville (UAH) is a part of the University of Alabama System. In June 1969, the University of Alabama Board of Trustees established the University of Alabama System with three independent, autonomous campuses at Huntsville, Birmingham, and Tuscaloosa. Each campus has a separate president who reports to the board of trustees through the chancellor of the system. Academic programs were initiated in Huntsville in 1950; in 1963 degree opportunities at the master's level were provided and in 1964, at the baccalaureate level. The first master's degree based on work begun and completed in Huntsville was awarded in 1964 and the first undergraduate degrees in 1968. Doctoral programs in physics and engineering were initiated in 1971. In 1973 UAH received its first residents in family practice and its first medical students taking electives toward their M.D. degree from the University of Alabama School of Medicine. UAH's first full-time medical students began their core clinical experience at the Huntsville component of the University of Alabama School of Medicine in the fall of 1974. UAH is accredited by the Southern Association of Colleges and Schools.

This brief chronology indicates that the programs at UAH are still in the developing stages, a characteristic of viable programs in any university. UAH was brought into being to meet the specific needs of scientific and technological enterprises and the cultural and intellectual needs of a rapidly expanding region. Since UAH is new, it is relatively unfettered by tradition and patterns of established practice. It is our intention to be innovative, even experimental, to explore what is new, to evaluate existing programs continually, to develop and establish curricula and pedagogical techniques calculated to help students live and perform well in a complicated environment.

The degree programs at UAH are administered by the Schools of Administrative Science, Arts, Humanities and Social Sciences, Engineering, Mathematical and Natural Sciences, Nursing, and Graduate Studies. Medical students taking clinical clerkships and electives at the UAH School of Primary Medical Care are admitted and receive their M.D. degrees through the School of Medicine in Birmingham.

The Division of Continuing Education offers noncredit activities in a variety of subjects for individual enrichment and professional advancement. The division offers professional development and certificate programs primarily for adults who are not interested in pursuing a traditional degree but who desire an organized sequence of study in a specialized area at university level.
The UAH Library is being developed to give maximum support to the academic and research programs. Its more than 253,000 volumes of monographs and journals reflect great care in selection; more than 210,000 items such as microfiche, federal documents, maps, technical reports, and sound recordings provide supplementary sources for special purposes. Acquisition of library resources has high priority. Courses in bibliography are offered by the professional library staff.

The availability of the Redstone Scientific Information Center, with holdings in science and technology that make it possibly the finest technical library in the Southeast, adds substantial strength to UAH programs, particularly at graduate level.

Students admitted to UAH have academic records that compare favorably with those in larger and older educational institutions. Through evaluations of previous academic records and entrance examinations, UAH attempts to ensure admission to those who are well qualified. Faculty members are present to help but not oversee students. Students, presumed mature, are expected to seek counseling and special assistance as needed.

The faculty has been assembled from leading universities throughout the United States and abroad. Its quality is evidenced in its writing, research, and reputation in the academic world.
The 337-acre UAH campus is in northwest Huntsville adjacent to Research Park. The 13 university buildings, all of which have been constructed since 1960, contain modern equipment and exemplify modern functional design. The 10-acre medical campus is in the downtown medical district and provides two modern buildings for medical education and patient health care.

Morton Hall, which is the oldest building on campus, presently serves as the focal point for activities and services related to student life, admission to UAH, academic advisement, student records and registration and general information services. In August 1984, these areas will be moved to the new Student Services Building. Morton Hall also houses classrooms and offices for the School of Administrative Science, the School of Arts, Humanities and Social Sciences, and the School of Graduate Studies.

The Science Building contains classrooms and laboratories for programs in biological, environmental, and physical sciences and offices for the dean and some of the faculty in the School of Mathematical and Natural Sciences. The building has modern laboratory equipment including a penthouse containing a live animal room and greenhouse. Interactive computer terminal facilities and the University's audio visual service office are also located here.

The former Auto Check building houses the Kenneth E. Johnson Environmental and Energy Center, the Alabama Solar Energy Center and the office of the state climatologist.

The UAH Library, a three-story, two-building unit, is made up of the first two phases of a library complex that will form the center of a cluster of academic buildings projected for the campus. The library has open-access stacks and a capacity of approximately 300,000 volumes. Services of subject specialists are available for students and faculty.

Madison Hall contains executive administrative offices, classrooms, and the Departments of Mathematics and Education and Developmental Learning.

The Research Institute houses the School of Engineering, Research Administration, laboratory space and equipment to support experimental research in engineering. Additionally, it houses the university computer facility.

The two-story UAH Union presently has facilities for dining, assemblies, dramatic presentations, and recreational activities. It also contains meeting rooms, offices for the student government association and student newspaper, and a bookstore. This facility is undergoing significant modifications and enlarge-
ment and by 1984 will house the Division of Student Affairs, Admissions and Records, Academic Advisement, Accounts Receivable, and General Information Services.

The Humanities Building, a two-unit complex, houses many of the faculty of music, art, English and history. In addition to instructional programs in the humanities, it contains large lecture rooms for varied university programs.

The School of Nursing Building is a contemporary triangular structure. Its four levels contain administration and faculty offices, classrooms, service areas, and a large and well equipped Learning Resource Center.

The Continuing Education Center contains the administrative offices and classrooms of the Division of Continuing Education. The Building also houses office space for Career Planning and Placement and the University Press.

The Marion Beirne Spragins Hall has classrooms and offices for Health and Physical Education and Athletic Department faculty and staff, a gymnasium with a seating capacity of 2800, a swimming pool, handball courts, and other physical education and recreational facilities.

The Central Receiving and Shipping Building houses the shipping and receiving office and storage facility, the Central Mail Room, and Reproduction and Duplication Department.

The Physical Plant Building contains offices, shops, and storage areas for the Physical Plant Department, which include administrative offices, building services, campus police, campus safety, general maintenance, grounds services, and the motor pool.

The Clinical Science Center in the downtown medical district contains the School of Primary Medical Care administrative offices and academic support services, including the Health Sciences Library and the Office of Audiovisual and Production Services. The building is the headquarters for the school’s medical student, continuing medical education, and emergency medical technician-paramedic training programs. It contains classrooms, faculty offices, and research laboratories.

Adjacent to the Clinical Science Center is the Ambulatory Care Center, which houses patient care services in family practice (the UAH Family Practice Center), internal medicine, obstetrics and gynecology, pediatrics, and psychiatry, as well as patient education services, clinical-support services, faculty offices, and the administration of the UAH-Huntsville Hospital Family Practice Residency Program.

University Housing

The university provides both on-campus and off-campus housing for a limited number of students. The university owns 88 two and three-bedroom apartment units within walking distance of the campus. On-campus residence facilities are available for full-time single students, handicapped students, and married students without children. The new on-campus residence halls consist of one-bedroom efficiency apartments for married and handicapped students and three-bedroom suites for single students.
The University Noojin House

Built in 1950 as the private residence of F. Kenneth Noojin, the house became available to the community through acquisition by the University of Alabama Huntsville Foundation, which in turn gave the facility to the University. The house is available for receptions, conferences, luncheons, parties, and workshops. The faculty, staff, students and community are encouraged to utilize the gracious facility.
The University of Alabama in Huntsville welcomes inquiries and applications from interested persons who wish to further their education. The student body is composed of individuals of all ages—traditional full-time college students and other adults who are combining their educational pursuits with work, family, and various activities. It is necessary to apply for admission well in advance of the date of proposed entrance but not more than one calendar year in advance. See UAH calendar for application deadline dates for specific terms.

Prospective freshmen should apply during their senior year in high school. Tentative admission will be granted on the basis of ACT (or SAT) scores and high school records through their junior year. Work completed in the senior year and confirmation of graduation will be reviewed before a student's admission is final.

Application forms, detailed instruction as to how to apply, and information brochures are available at the Office of Admissions and Records in Morton Hall. A copy of the UAH catalog is mailed to each new student admitted; additional copies are available for purchase in the UAH bookstore.

Pre-Admission Services

Information for prospective students is available through the Pre-Admission Services Program in the Office of Admissions and Records. Campus tours on individual or group basis are available, as well as conferences with faculty members, who welcome the opportunity to meet interested individuals and discuss their enrollment plans and opportunities at UAH.

Admission to the Freshman Class

Admission as a regular student in the freshman class at UAH is a decision based on performance in academic subjects in high school and scores from college entrance tests. The two factors are considered together, with higher results in one area able to offset lower outcome in the other. Students with ACT scores of less than 16 or SAT combined scores of less than 800 are not usually admitted as regular students.
Plan A

High school graduates may be admitted as freshmen on the basis of acceptable high school records and scores achieved on the American College Testing (ACT) program examinations. (ACT scores are not required for applicants who graduated from high school five or more years ago.)

An applicant should present a minimum of 16 high school units including specified units in the following categories:

- English - 4
- History or Social Studies - 1
- Algebra - 1
- Geometry - 1
- Electives - 9, 5 of which should be academic

UAH urges high school students to include in their elective courses additional units in mathematics, foreign languages, natural sciences, and social studies. The School of Engineering and the School of Mathematical & Natural Sciences strongly recommends that the additional elective units include two units of college preparatory mathematics. Applicants who plan to major in engineering or in a natural science should also include one unit of physics and one unit of chemistry. Students will find it to their advantage to follow these recommendations in their choice of high school electives so that they may be able to begin their college program at the appropriate level.

Applicants having deficiencies in the required high school courses may be admitted in good standing. The deficiencies, however, must be removed during the first year of enrollment in a manner approved by the department concerned. Courses taken to remedy entrance deficiencies cannot be used to satisfy degree requirements.

Plan B

Persons who have not graduated from high school may be admitted on the basis of satisfactory scores achieved on the General Educational Development (GED) test. UAH is a testing center for the GED program. Anyone seeking additional information or wishing to take the GED examination should get in touch with the Office of Testing Services.

Application Procedure for Freshmen

An applicant must submit:

1. Completed application forms.
2. Nonrefundable application fee of $15.
3. Completed student medical form.

In addition, he must request that:

4. Two copies of his high school transcript be sent from the high school to the Office of Admissions and Records.
5. (Plan A) ACT test scores be sent from ACT to the Office of Admissions and Records.
   (Plan B) Official score reports of GED examinations be sent from the agency administering tests to the Office of Admissions and Records if the applicant does not have a high school diploma.
The application for admission must be in the Office of Admissions and Records by the date specified in the UAH calendar.

An individual who has applied under either Plan A or Plan B and who does not qualify as a regular beginning freshman may be admitted to UAH as a special student. The special student will be strongly advised to carry a light course load until he has completed a total of 15 semester hours of work. If a special student has achieved an overall C average at the completion of 15 or more hours of work, he will be admitted as a regular degree-seeking student. Credits earned as a special student are recorded on the student's permanent record and will count if applicable in a regular undergraduate degree program when the individual has qualified for admission as a regular student.

A student enrolled in this category is subject to the same periodic review of his record as a regular student and is subject to the university's regulations regarding scholastic probation and suspension. (See Academic Information.) If a special student becomes subject to academic suspension, the suspension is for a minimum of one term, and the student must petition the Admissions Committee for approval to re-enroll.

Admission of Academically Talented High School Students

UAH welcomes inquiries from academically talented high school students who wish to enroll in courses for college credit during the summer term between their junior and senior years of high school or concurrent with their senior year in high school. For detailed information, such students should see their high school counselors or personnel in the Office of Admissions and Records.

Admission of Transfer Students

Students who have previous academic records at a college or university level may be admitted to UAH as transfer students. The high school transcript of a transfer student will be reviewed for completion of required units, and deficiencies, if any, will be noted on the admission certificate. A student who is currently on suspension from another college or university is not eligible for enrollment until his suspension period has terminated.

Students Transferring within the University of Alabama System

A student enrolled in an undergraduate school or division at either the University of Alabama in Birmingham or the University of Alabama in Tuscaloosa may transfer to an undergraduate division at UAH as long as he is eligible to continue where previously enrolled in the university. Application fee is not required.

Students Transferring from Other Institutions

A prospective transfer student who has attempted fewer than 18 semester hours of work at an accredited college or university and who has at least a 1.0 average on a 4.0 scale will be considered for admission on the basis of high school grades and ACT scores.
Applicants with previous records showing 18 semester hours or more of work attempted at accredited colleges or universities must have a minimum overall C (2.0) average on all work attempted in order to qualify for unconditional admission.

An individual who has applied and who does not qualify as a regular transfer student may be admitted on probation as a special student. A transfer student enrolled in this category is subject to the same periodic review of his academic record as a regularly admitted student who is on scholastic probation. (See Academic Information.) If at such a review point a special student becomes subject to academic suspension, the suspension is for a minimum of one term, and the student must petition the Admissions Committee for approval to re-enroll.

Evaluation of Transfer Credit

For all transfer students who indicate an intention to earn a degree at UAH, transfer credits are evaluated by personnel in the Office of Admissions and Records before or during the first term of enrollment. An individual who enrolls as a non-degree student and later decides to work toward a degree must request an evaluation of transfer credits. The application of such accepted credits to a particular program of study will be made and approved at the time of official determination of the individual's program of study. Acceptance and application of credits are two separate and distinct processes.

Credits earned in quarter hours will be converted to semester hours on the basis of two-thirds of one semester hour for each quarter hour.

In the case of a student who has less than an overall C average at the time of admission, transferred courses with grades of D are not accepted. For a student transferring within the University of Alabama System, credit will be accepted for appropriate courses passed regardless of the overall grade point average.

A maximum of 64 semester hours of credit from a junior college may be applied toward a degree. Exceptions to the 64-hour maximum must be justified and approved in writing by the dean of the school in which the student is enrolled.

If the previous record was earned at an institution not holding regional accreditation, a decision on acceptance of credits will be made on an individual basis. If credits are accepted, they will be classified as provisional. Full credit for a provisional credit will be based upon performance during the first 30 semester hours attempted at UAH. Each student with credits in this category should see the registrar concerning his status at the end of the term in which he has completed his first 30 semester hours at UAH.

Credit for engineering courses taken at schools accredited by the Accrediting Board for Engineering and Technology (ABET) is transferable to UAH. Engineering courses taken in non-ABET accredited institutions may also be applied toward a BSE degree based upon an appropriate examination (written or oral) at the discretion of the respective department. This regulation applies to courses taken after September 1, 1979. All inquiries concerning applicability of credit should be made to the UAH Engineering Department chairman where the course, or its equivalent, is being taught.

Credit for Business Administration courses taken in schools with American Assembly of Collegiate Schools of Business (AACSB) accredited programs is
transferable to UAH. Credit in courses taken in programs without AACSB accreditation may be accepted with approval of the Dean of the School of Administrative Science. Transfer credit will be granted for administrative science courses only with a "C" or better. This policy applies to courses taken after September 1, 1983. All inquiries concerning applicability of transfer credit should be made to the Programs Office, School of Administrative Science, Room 332, Morton Hall, (205) 895-6024.

Application Procedure for Transfer Students
An applicant must submit:
1. Completed application form.
2. Nonrefundable application fee of $15.
3. Completed student medical form.

In addition, he must request that:
4. Two copies of his high school transcript be sent from the high school to the Office of Admissions and Records.
5. Two copies of official transcripts from each collegiate institution attended be sent directly from the previous institution(s) to the Office of Admissions and Records.

The application for admission must be in the Office of Admissions and Records no later than date specified in the UAH calendar.

Admission of Irregular Postgraduate (IPG) Students
An applicant already holding a bachelor's or other higher degree will be considered for admission as an irregular postgraduate.
A student admitted in this category may take any course at the 500 level or below if he has met the prerequisites. In some instances, a student may, with the approval of the department chairman, take courses numbered 600 or above. Credits earned in these courses while a student is classified as an IPG, however, will not carry graduate credit.
A person whose application to the Graduate School has not been approved on the basis of quality-point average, test score or both may apply for admission as an irregular postgraduate. Upon completion of 12 hours or more of advanced-level courses with an average grade of B or better, a student may reapply for admission to the Graduate School. Evaluation of the application will include the demonstrated performance in the advanced-level courses. In this case, an applicant may be admitted provisionally if acceptance is recommended by the appropriate academic department.

Admission of Special Nondegree Students
Any adult who has completed high school or completed the GED with a minimum score of 50 may apply for admission as a special nondegree student. Credits earned or courses audited as a special nondegree student are recorded on the student's permanent record and will count if applicable in a regular
undergraduate degree program when the individual qualifies for admission as a regular student.

A student enrolled in this category is subject to the same periodic review of his record as a regular student and is subject to the university's regulations regarding scholastic probation and suspension. (See Academic Information.) If a special nondegree student becomes subject to academic suspension, the suspension is for a minimum of one term, and the student must petition the Admissions Committee for approval to re-enroll.

A student enrolled as a special nondegree student must satisfy course prerequisites for each course taken.

Application Procedure for Special Nondegree Students
An applicant must submit:
1. Completed application form.
2. Nonrefundable application fee of $15.
3. Completed student medical form.

No transcripts or other credentials are required. A special nondegree student must certify that he is:
1. A high school graduate or has a satisfactory score of 50 or higher on the GED.
2. A student not under current suspension from another collegiate institution.

Admission of International Students

International students are expected to meet all established requirements for admission from secondary schools or from other colleges and universities. All international applicants must apply for admission at least three months in advance of desired attendance date.

Admission Requirements
An undergraduate applicant must submit:
1. Completed application form.
2. Nonrefundable application fee of $15.
3. Completed student medical form.

In addition, he must request that:
4. Two official copies in English of secondary school and college or university transcripts be forwarded to the University of Alabama in Huntsville directly from the institution(s) attended. Do not send personal copies.
5. American College Test (ACT) scores be sent directly to UAH from ACT headquarters. (ACT is not required of an applicant who has earned more than 18 semester hours of college work or was graduated from high school more than five years ago.) (SAT may be used as a substitute for the ACT.)
6. Scores from the Test of English as a Foreign Language (TOEFL) be sent directly to UAH from Educational Testing Service.
7. A certified financial statement be submitted as evidence of sufficient finances to cover his university and personal expenses while attending UAH. In addition, a deposit of $1,500 is required before an applicant will be considered for admission. To make this deposit, have a bank cashier's check drawn in U.S. dollars for $1,500 made payable to the University of Alabama in Huntsville. Mail this check to the Office of Admissions and Records, the University of Alabama in Huntsville, Huntsville, AL 35899. If an applicant is unable to attend UAH after making the deposit or if admission is denied, the deposit will be returned. The deposit must be maintained at $1,500 until the student completes his studies at UAH. The amount held on deposit by the university will accrue interest.

8. Evidence be presented of university-approved health insurance coverage. Proof of continued coverage must be presented by the student each term he is enrolled.

Individuals in the U.S. on a student visa who are transferring from another college or university in the U.S. must show evidence of release from the previous program by the international student adviser at their previous school. Transfer students must have completed the equivalent of one academic term at those institutions before admission to UAH.

A graduate applicant must submit:
1. Completed application form.
2. Nonrefundable application fee of $15.
3. Completed student medical form.

In addition, he must request that:
4. Two official copies in English of secondary school and college or university transcripts be forwarded to the University of Alabama in Huntsville directly from the institution(s) attended. Do not send personal copies.
5. Graduate Record Examination (GRE) or Graduate Management Admission Test (GMAT) scores be sent directly to UAH from Educational Testing Service. (See Graduate Admission.)
6. Scores from the Test of English as a Foreign Language (TOEFL) be sent directly to UAH from Educational Testing Service.
7. A certified financial statement be submitted as evidence of sufficient finances to cover his university and personal expenses while attending UAH. In addition, a deposit of $1,500 is required before an applicant will be considered for admission. To make this deposit, have a bank cashier's check drawn in U.S. dollars for $1,500 made payable to the University of Alabama in Huntsville. Mail this check to the Office of Admissions and Records, the University of Alabama in Huntsville, Huntsville, AL 35899. If an applicant is unable to attend UAH after making the deposit or if admission is denied, the deposit will be returned. The deposit must be maintained at $1,500 until the student completes his studies at UAH. The amount held on deposit by the university will accrue interest.
8. Evidence be presented of university-approved health insurance coverage. Proof of continued coverage must be presented by student each term he is enrolled.

Readmission

A student who has not attended UAH for one or more terms and who wishes to return should consult with the Office of Admissions and Records to determine his status and the conditions under which he may resume his studies.

Admission to the Graduate School

See section on the School of Graduate Studies for detailed information.

Admission to Student and Resident Medical Programs

For information concerning admission to the University of Alabama School of Medicine and to the UAH-Huntsville Hospital Family Practice Residency Program, see section on the School of Primary Medical Care.

Residency

A determination of residency status is made at the time the student is admitted to UAH. For further information, consult the Admissions Office.
# Financial Information

## UNDERGRADUATE TUITION

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<thead>
<tr>
<th>No.</th>
<th>Course Fee</th>
<th>Building Fee</th>
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For each semester hour in excess of 12 add $33.00 per term ($66.00 for out-of-state).

THE ABOVE TOTAL DOES NOT INCLUDE LAB FEES, LATE-REGISTRATION OR CHANGE-OF-COURSE FEES.

## GRADUATE TUITION

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For each semester hour in excess of 9 add $50.00 per term ($100.00 for out-of-state).

THE ABOVE TOTAL DOES NOT INCLUDE LAB FEES, LATE-REGISTRATION OR CHANGE-OF-COURSE FEES.

An estimated average cost of books per term for full-time students is $85.00

*These fees do not apply to any short-term, off-campus, or noncredit offering. For additional information on these courses see section on Division of Continuing Education.
Billing and Payment Procedure

Students participating in regular registration will receive in the mail (see mailing date in calendar in timetable of classes) a schedule of courses, a tuition bill, and an identification card. Tuition charges must be paid in full by the close of business on the due date indicated on the statement. Students whose payments have not been received by the deadline will have their registration cancelled, and such students will be required to complete a new set of registration materials during final registration hours.

Tuition will be payable at the time of registration for all who register during periods of final registration.

Charges resulting from dropping, adding, or other charges will be due at the time the change is made.

Many students have all or part of their tuition and other costs paid by various sponsoring agencies (including tuition remission for faculty, staff and their dependents). It is the student’s responsibility to see that the Bursar’s Office receives the approved tuition assistance authorization from his sponsor. In many cases the sponsor does not pay the entire statement. These students should contact the Bursar’s Office to determine the unpaid amount and make full payment before the due date to avoid cancellation of their registration.

Fees for courses being audited are the same as those being taken for credit.

Full-time students may include full-term, regular credit courses offered through the Division of Continuing Education under the maximum fee structure of UAH. Standard fees and fee conditions, however, do not apply for short-term, off-campus, or noncredit offerings. For additional information see Division of Continuing Education in this catalog.

Other Charges

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Replacement of I.D. card ........................................... 5.00
Transcript - first transcript free, each additional transcript .................. 2.00
Graduation - If qualifications for graduation are not met and if diploma has been ordered, $10.00 will be refunded .......................................................... 15.00
Duplicate Diploma ..................................................................... 7.50
Thesis binding (3 copies) each additional copy .................................. 6.00
Vehicle registration
regulations concerning traffic and parking will be distributed at registration ........................................... 7.00

Withdrawals and Refunds
After classes have begun, students may withdraw from one or more classes until the end of the sixth week of classes. A student desiring to withdraw from school must complete a withdrawal request form at the Office of Admissions and Records, Morton Hall. Date of withdrawal is the date the written request is received at the Office of Admissions and Records. Date of withdrawal will determine the amount refunded. Only course fees, lab fees, and building fund fees are refundable.

Date of Withdrawal from School

Fees Owed
Withdrawal after registration is completed but before classes begin .................................................. Registration fee $ 5.00
During first two weeks .............................................................. Withdrawal fee 15.00
After first two weeks of class ..................................................... 100% of basic fee

Refund checks will be issued as quickly as they can be processed after the second week of classes.

Students suspended for disciplinary reasons shall have no right to refund of any portion of any fees paid or due to be paid.

School of Nursing
Laboratory Fee (per term)* ..................................................... $ 60.00
Liability Insurance (per year)* .............................................. 25.00
Uniforms (junior year) .............................................................. approx. 200.00
School of Nursing Pin (graduation) ........................................... variable
Annual health examinations* ................................................... variable
*undergraduate and graduate students
School of Primary Medical Care

General fee (per term) ........................................... $ 880.00
Out-of-state residents (per term) .................................. 3520.00
UAH student health service fee (per term) .................. 25.00
Student activity fee (per term) ........................................... 16.00
General building fee (per term) ........................................... 30.00
Medical building fee (per term) ........................................... 34.00
Hospitalization insurance (per year) ........................ variable
Personal liability insurance (per year) ...................... 25.00

*The complete student curriculum for the University of Alabama School of Medicine normally takes 12 quarters to complete.

Financial Aid

See Student Affairs.

University Housing

For current rate information contact the Housing Office at:
Housing Office
The University of Alabama in Huntsville
Huntsville, Alabama 35899
(205) 895-6108

In addition to rental charges, residents are also responsible for their gas and electricity usage each month. Residents desiring a telephone assume responsibility for proper installation of telephone and payment of all bills.
Student Affairs

The Division of Student Affairs provides services to individual students which facilitate the student's attainment of academic, cultural, social and personal goals. It also coordinates and supports group activities and campus events that enhance the quality of student life at the university. The Division of Student Affairs also supports Student Government Association activities and programs, as well as interprets and administers the Student Judicial Code, which protects student rights and assists students in their awareness of student responsibilities. These student needs and interests are served by financial aids, the university union, housing, athletics, club sports, student life, auxiliary services, career planning and placement, intramurals, and leadership training.

Tutoring Services

Tutoring services are coordinated through the UAH satellite unit of the North Alabama Educational Opportunity Center and the Veterans Educational Assistance Program. All students at UAH are eligible for the EOC Tutorial Program, which is provided at no cost. Students who are eligible for the Veterans Educational assistance Program may be reimbursed for tutoring arranged through the EOC Office. Students desiring to tutor or be tutored may make application with the EOC counselor-coordinator at the EOC Office, Room 229 Morton Hall, or telephone 895-6450.

Office of Financial Aids

Student Aid

UAH has several programs to assist students in financing their college education. Comprehensive, up-dated information on all financial aid offered through the Office of Financial Aids is available in a booklet published annually by the Division of Student Affairs. It includes detailed information about kinds of aid, eligibility guidelines, application procedures, criteria for awards, disbursement methods and regulations, and institutional policy followed in administration of aid. These booklets and necessary forms are available in the Office of Financial Aids.

Students of academic promise who can demonstrate financial need are encouraged to apply for assistance. Realistic financial planning is an essential part of college preparation. UAH helps qualified students find employment, scholarships, and loans as its resources permit. In planning a program of
financial assistance, consideration should be given to the advisability of combining scholarships, loans, and part-time employment since one kind of aid alone is inadequate in extreme cases.

Students should make financial plans well in advance of entering the university. They are advised to write the Office of Financial Aids requesting a copy of the financial aids booklet at the time of application to the university. Applications for student aid should be filed at the Office of Financial Aids before the priority deadline, March 1, for the following school year. No award implies automatic renewal; a new application must be submitted by this deadline each year.

**American College Testing Need Assessment**

UAH participates in the American College Testing (ACT) Need Assessment Program. The amount of financial aid granted a student is based upon financial need, which ACT assists colleges and universities in determining. Students are required to submit a Family Financial Statement (FFS) to ACT designating UAH (Code 0053) as a recipient of the needs analysis report. The FFS should be mailed to ACT no later than March 1. The FFS may be obtained from a secondary school or the Office of Financial Aids at UAH.

**Types of Financial Aids**

**Scholarships**

Most scholarships at UAH are awarded for the academic year (nine months) but are seldom available for the summer term. Nearly all scholarships are awarded on a merit-need basis. Most available scholarships vary from $100 to $1,000. Scholarship applications are available at the Office of Financial Aids. The deadline for receipt of applications is March 1.

The following scholarships are awarded annually:

*The Kelly Zettle Memorial Scholarship* was established in memory of Jacqueline Kelly Zettle from donations to the university. It is awarded each year to a student or students pursuing a music major. To be eligible, one must be a full-time student having a grade-point average of at least 2.0.

*The Gerhard B. Heller Memorial Scholarship* was established in memory of the late Gerhard B. Heller from donations to the university from family and friends. It is awarded annually for one year beginning with the fall term to a full-time junior or senior majoring in physics or chemistry. The recipient must have an overall 3.0 grade-point average and not less than 3.5 average in physics if a physics major or in chemistry if a chemistry major. The scholarship consists of the earned interest or dividends on hand at the time of the scholarship grant and is not to exceed $1,000.

*The Samuel Palmer Memorial Scholarship* is a scholarship trust fund of $17,217.19, established in 1967 by the Board of Trustees of the University of Alabama. Interest from this fund is used for two scholarships awarded annually to UAH students. The recipients are selected on the basis of scholastic standing and leadership and must be full-time undergraduate students.

*The Carl T. Jones Engineering Scholarship* was established from donations to UAH and the University of Alabama Huntsville Foundation in memory of Carl T. Jones, prominent Huntsville businessman and civic leader. It is awarded annually to two full-time freshman students majoring in engineering and desiring to practice this profession in Alabama.
The JoAnn Sloan Memorial Scholarship was established in memory of JoAnn Elizabeth Sloan from donations to the university from family and friends. The award is given annually to full-time students majoring in nursing. The recipient must be in good standing with demonstrated need for financial assistance.

The American Institute of Industrial Engineers, Inc., Scholarship—The North Alabama chapter of AIIE provides two tuition scholarships each year for one term. A recipient is selected for fall term and another for spring term. To be eligible, the student must be a full-time undergraduate student who intends to specialize in industrial and systems engineering.

The Gregory David Johnston Scholarship was established in honor of Gregory David Johnston and awarded annually by the UAH Foundation to a senior student at Huntsville High School. This $1,000 scholarship is awarded to a student who demonstrated outstanding leadership ability.

The Felix L. Newman Scholarship was established by a gift from Felix L. Newman, a long-time resident of Huntsville and devoted friend of the university. It is awarded each year to a student at the junior level or above pursuing a degree in the humanities. To be eligible, the recipient must be a full-time student having a grade-point average of not less than 2.0. The scholarship is the amount of the earned interest or dividend on the principal at the time of the granting for one or more scholarships. No scholarship, however, shall exceed $1,000 for any academic year.

The Wernher von Braun Scholarship was created in honor of Dr. von Braun by his numerous friends and awarded annually to a full-time junior or senior. The recipient is selected on the basis of his grade-point average, which must be 3.5 or better, his contribution to UAH and the community, and his potential for leadership.

The University Women's Club Scholarship is a tuition scholarship awarded annually by the University Women's Club to a full-time student at UAH with sophomore standing having a minimum of 3.0 grade-point average. The recipient must be an academically deserving student who has demonstrated leadership or a potential for leadership.

The Huntsville Community Chorus Scholarship is a scholarship of $375 awarded each year by the Huntsville Community Chorus Association. To be eligible the student must be a full-time music student in voice, maintain a 2.8 grade-point average, be a regular participant in the Huntsville Community Chorus during the period of the award, and audition before a committee of the music faculty and representatives of the chorus.

The Huntsville Music Study Club Scholarship-The Huntsville Music Study Club, an affiliation of the Alabama Federation of Music Clubs, provides a $150 scholarship each year to a music major. To be eligible, the recipient must be a full-time undergraduate student who has sophomore or higher standing, show evidence of need and academic promise, demonstrate talent and promise (by audition), and be a U.S. citizen.

The University Undergraduate Tuition Scholarship is awarded by individual academic departments to students demonstrating outstanding scholarship. Each scholarship covers the basic tuition, excluding special fees and laboratory fees, for three consecutive terms. To be eligible, the recipient must be a full-time undergraduate student who has completed at least 59 credit hours but no more than 91 credit hours by the end of the term in which he is considered a
candidate, have an overall grade-point average of 3.0, be pursuing a major in the area for which the scholarship is granted, have on file an approved AOC form and be in good financial standing with the university.

The University Alumni Scholarship—The Alumni Association provides two full scholarships each year to full-time undergraduate students. The recipients are selected on the basis of need, leadership ability, and academic achievement.

The Alabama Society of Professional Engineers is a scholarship awarded each year by the Huntsville chapter of the Alabama Society of Professional Engineers to a full-time freshman engineering student who has a minimum 3.0 grade-point average. This fund provides a $200 grant that is awarded during the fall term following the award.

The University of Alabama Huntsville Foundation Scholarship is awarded annually to high school seniors from Madison County who plan to attend UAH. Criteria for eligibility consists of scholastic ability, leadership, and financial need. Selection of winners is made by the high schools. The Huntsville Foundation also awards several scholarships to junior and senior students throughout the year.

The Gorges Scholarship—UAH is a corporate institute for Gorges Scholarship Award winners and offers a limited number of tuition scholarships to the ten finalists in the Gorges Scholarship Foundation competition. These scholarships are renewable each year for four years if the student maintains a 3.0 or better average.

The Chesebrough-Ponds Scholarship is an annual scholarship fund of $4,000 provided by the Chesebrough-Ponds Corporation for the purpose of assisting deserving students.

The Omicron Delta Epsilon Scholarship is awarded annually to a student majoring in economics. The recipient must have and maintain an overall average of 3.0 and have completed 12 hours in economics.

The George W. Ditto Scholarship, an endowed scholarship, was established in memory of George W. Ditto, a man who devoted his life to the teaching profession. Two full-tuition, one year, nonrenewable scholarships are offered annually to two science or engineering majors.

The Mildred D. Simmons Memorial Scholarship was established by a gift from William K. Simmons, Jr., of Huntsville and by other devoted friends and relatives. Mrs. Simmons was a graduate of Crawford W. Long School of Nursing and practiced in Huntsville for many years. The scholarship is awarded each year to a student in the School of Nursing. Eligibility is determined by outstanding scholarship and clinical competency as judged by a faculty committee of the School of Nursing. One or more scholarships will be awarded in earned interest or dividends on hand at the time of the granting, but not less than $300.

The Recruitment and Retention Scholarships—The Division of Student Affairs awards several leadership scholarships to participants in nonathletic teams and organizations such as Forensics, College Bowl, Cheerleaders, and Host-Hostesses. These are one-year, nonrenewable scholarships.

The UAH Academic Scholarship Program—Several full-tuition scholarships are awarded to students of sophomore through graduate status who demonstrate exceptional scholastic ability. Application is through the Office of Financial Aids. The scholarships are renewable based on the cumulative grade-point average.
The Economics Scholarship was established for a junior or senior student majoring in economics with a grade-point average of 3.0. The recipient will be selected by the faculty of the School of Administrative Science.

UAH Honor Scholarship Program—Full-tuition scholarships are awarded to National Merit Semifinalists who graduate from high schools in the UAH service area. The scholarships are renewable based on cumulative grade-point average.

Leroy Simms Scholarship Fund—An endowed fund established to recognize the many contributions of Mr. Leroy Simms to The University of Alabama in Huntsville. The full-tuition scholarship is awarded annually to the National Merit Semifinalist with the highest composite ACT score.

R. Wayne Sanders Memorial Scholarship—An endowed fund established by Mr. and Mrs. M.W. Sanders in memory of their son, R. Wayne Sanders. The full-tuition scholarship is awarded annually to a junior or senior pursuing a degree in the liberal arts. The recipient must exhibit outstanding leadership traits.

Thomas and Minnie Rast Scholarship Fund—An endowed fund established to recognize the many contributions and dedicated service of Mr. and Mrs. Thomas E. Rast to The University of Alabama in Huntsville. Two full-tuition scholarships are awarded to junior and senior level students pursuing an undergraduate degree at UAH.

Cullman Scholarship—Two full-tuition scholarships awarded annually to two Cullman County seniors who have outstanding academic and extracurricular high school records.

Scottsboro Rotary Club Scholarship—Two full-tuition scholarships awarded annually to two Scottsboro High School seniors who have outstanding academic and extracurricular high school records.

3M Scholarship (Minnesota Mining and Manufacturing Company)—Three full-tuition scholarships awarded annually to Chemical Engineering majors who reside in Morgan, Lawrence, or Limestone counties.

Arab Rotary Club Scholarship—Two full-tuition scholarships awarded annually to two Arab High School seniors who have outstanding academic and extracurricular high school records.

James D. Hayes Scholarship—An endowed fund established to recognize the many contributions and dedicated service of Mr. James D. Hayes to The University of Alabama in Huntsville. The full-tuition scholarship is awarded to a junior or senior engineering major.

William Penn Nichols Memorial Endowed Scholarship—An endowed fund established by Mrs. Josephine Nichols Holliman to honor the memory of her father, William Penn Nichols. One full-tuition scholarship is awarded annually to a deserving student with preference given to descendents of the late William Penn Nichols.

Decatur Scholarship—Two full-tuition scholarships awarded annually to two Decatur, Alabama seniors who have outstanding academic and extracurricular high school records.

Housing Honor Scholarship—Several scholarships are awarded annually to exceptional students throughout Alabama to cover the cost of University Housing.

Frances C. Roberts Endowed Scholarship—An endowed fund established by the History Department of The University of Alabama in Huntsville to honor
Dr. Frances Cabaniss Roberts for her many contributions and dedicated service. A full-tuition scholarship is awarded annually with preference given to a junior or senior history major.

William R. Gillies Society of Manufacturing Engineers Scholarship—William R. Gillies Society of Manufacturing Engineers Scholarship—A one year scholarship for $1,000 established by the North Alabama Society of Manufacturing Engineers. The scholarship is awarded annually to a mechanical engineering or industrial and systems engineering major who has earned sixty credit hours or more.

State Nursing Scholarships

An act was passed by the Alabama legislature in 1957 to provide scholarships for basic nursing education. These scholarships are each $600 to be awarded to applicants from the state-at-large. Applicants must be Alabama residents and accepted for admission by the UAH School of Nursing. Continuation of the scholarship for three years after the first year is subject to annual review and contingent upon the student’s progress and aptitude. A scholarship student must agree to practice professional nursing in Alabama for at least one year immediately after graduation from UAH School of Nursing. If the recipient is unable to fulfill his obligation, it may be satisfied by his repaying the amount of the scholarship received to UAH Scholarship Fund.

The Alabama legislature in special session in 1977 passed into law fifteen scholarships of $3,800 each for graduate study in nursing. They will be distributed as far as practicable throughout the state. Criteria for the selection of recipients and awarding of scholarships has been established by the Alabama Board of Nursing. Application should be made directly to the Alabama Board of Nursing.

Loans

Although it is sometimes necessary to borrow money to finance an education, caution is advised. Generally a student should not rely primarily on loans and is advised not to borrow more than half of what is needed to meet expenses.

The National Direct Student Loan Program is available to all students enrolled at least half-time and who have financial need indicated by the Family Financial Statement. An undergraduate may be eligible to borrow a maximum of $6,000 over several years. Graduate or professional students may be eligible to borrow a maximum of $12,000, including their undergraduate loans. The program contains a provision that part of the loan plus interest may be canceled if the borrower performs military service in hostile areas. Forgiveness is also provided for teachers of handicapped or disadvantaged students and for those teaching in other special programs designated by the U.S. Office of Education.

The Guaranteed Loan Program provides federal backing for loans made through private lending agencies such as banks, savings and loans, and credit unions.

A maximum of $2,500 per academic year may be applied for in most states if the educational costs warrant borrowing this much money. Total loans outstanding may not exceed $12,500 for undergraduate or vocational students. The aggregate maximum may be extended to $25,000 for students who borrow for graduate study.
Federal Nursing Student Loan and Scholarship Programs

This program was established by Congress as part of the Public Health Services Appropriation Acts. It is designed to assist students who need financial assistance to pursue a course of study leading to a degree in nursing. The goal is to increase opportunities for youth seeking careers in nursing by providing long-term, low-interest loans and scholarships to students in need of such assistance. These student loans and scholarships may be made to full-time and half-time students who are citizens, nationals, or permanent residents of the United States.

The maximum nursing student loan available to an individual borrower in an academic year is $2,500 or the amount of the student’s need, whichever is the less. The maximum amount lent during a twelve-month period to any student enrolled in a school that provides a course of study longer than the nine-month academic year may be proportionately increased. The aggregate amount a student may receive for all years is $10,000.

Nurse Traineeship Program

This program was established by the Nurse Training Act of 1975 and provides grant assistance to currently licensed professional nurses who wish to enroll full-time in a graduate nursing program. Several full tuition grants are awarded yearly.

Loans and Scholarships for Medical Students

Information about financial assistance for medical students is available from the Office of Medical Student Affairs, Clinical Science Center.

Emergency Loans

Emergency Student Loan Fund—Any full-time student of UAH officially enrolled and physically present on campus is eligible to apply for an emergency loan. These loans are made for emergencies only. The maximum amount of the loan is $200, but normally loans will be made for $100 or less for a maximum of ninety days or until the end of the term, whichever comes first. Applications are available from the Office of Financial Aids.

Grants

A Supplemental Educational Opportunity Grant—provides aid to undergraduate students who would not, except for the grant, be financially able to attend college. A student must be accepted for enrollment, show evidence of academic promise, and be capable of maintaining good standing in his course of study. Grants may be renewed for the four years of undergraduate work, subject to the availability of funds unless a major change in the family’s financial condition causes the student to be ineligible. Grants are awarded in compliance with eligibility based on federal guidelines.

The Pell Grant Program—assists eligible students by providing help in meeting the cost of postsecondary education.

To be eligible, a student must meet the following criteria: (1) establish financial need by means of the Pell application; (2) be enrolled in an eligible program at an eligible college, university, vocational, or technical school; (3) be a U.S. citizen or in the U.S. for other than a temporary purpose and intend to become a permanent resident or be a permanent resident of the Trust Territories of the Pacific Islands.
The Pell application is submitted to a processing agency which calculates the student's aid index. The institution then uses this SAI report to calculate the basic grant award based on full or part-time enrollment and the cost to attend the institution. All eligible students are awarded grants.

The Alabama Student Assistance Program— is a state-federal aid program designed to provide Alabama residents financial assistance for undergraduate postsecondary education. Grants are awarded for one year. The grants are renewable, but new applications must be made each year. All awards are determined by student eligibility requirements, available funds, and student need. Students should contact the Office of Financial Aids for information regarding eligibility, application, selection, and awards procedures.

Federal Financial Aids Repayment

Federally funded student financial aid (Pell, SEOG, NDSL, FNL) to a student who withdraws after registration but before the tenth day of an academic term will be repaid to the respective program source. When withdrawal or reduction of class load occurs after the tenth day of the term, full tuition charges will be paid from the aid source. The unused proportion of the indirect aid will be repaid to the respective aid source. Specific regulations governing this policy may be found in Student Financial Aids, a brochure available in the Office of Financial Aids.

Work-Study Program

The College Work-Study Program provides employment for students who need financial assistance. A student works part-time while attending the university and during vacation periods. Students engaged in this program work on campus. In determining eligibility, preference will be given to students with the greatest financial need.

Graduate Fellowships and Assistantships

Persons interested in graduate fellowships or assistantships or both should direct their inquiries to the appropriate academic departments.

Career Planning and Placement

The Career Planning and Placement Office is a developmental and educative service which assists students to identify their individual capabilities, interests, skills, and acquired knowledge and to relate these to meaningful vocational options. This service is responsible for communicating career, occupational, and employment information to the University as a whole, and interpreting options available to students within graduate school, business, government, education and non-profit agencies. The culmination of these activities is placement counseling and referral to employers or graduate schools.

The Career Planning and Placement office offers the following services to all students and alumni: part-time employment opportunities within the community of Huntsville and surrounding areas; full-time placement opportunities and on-campus interviews for graduating seniors and for UAH alumni; career planning assistance with professional staff; workshops in resume writing skills, interview skills, and job search techniques; access to a computerized guidance information system with occupational and college information through Montgomery; Career Resource Center of occupational information,
company literature, salary information and graduate school information; and a job fair and a career fair co-sponsored each Spring with the UAH Business Club.

A credentials file which includes a resume, transcript and college activities is established for each senior who registers with this office. Information in the file is available to employers upon request. Each registered student receives a monthly newsletter, *Career Directions*, which provides current employment trends, job-hunting hints, and the monthly on-campus recruitment schedule.

Students may register for any of the services at the Career Planning and Placement Office, Room 139, Continuing Education Building. Appointments may be made with the Placement Coordinator by calling 895-6612 between 8:15 a.m. and 5 p.m., Monday through Friday.

**Cooperative Education Programs**

Cooperative Education is a program through which students' academic work is enriched with productive periods of practical experience in business, industry and government. In addition to gaining practical insights into their fields of interests, students enrolled in the program earn sufficient money to pay a substantial portion of their university expenses.

Students participating in the UAH Cooperative Education Program alternate terms of full-time study with terms of full-time career-related work. Work assignments are arranged by the UAH Cooperative Education Office. The work assignments are with leading employers in the area.

There are two levels in the Cooperative Education Program—undergraduate and graduate.

**The Undergraduate Program**

Any full-time UAH student may participate in the program if the student has a minimum of 16 hours credit, at least 8 of which were earned at UAH, and if he has an overall grade-point average (GPA) of at least 2.5 on all courses attempted at UAH.

The undergraduate Cooperative Education Program is open to all UAH students, regardless of race, color, religion, or sex. Students majoring in all disciplines are potential candidates for the program.

**The Graduate Program**

This program is limited at present to those students admitted in a degree program as graduate students in science and engineering, administrative science, or English.

Typically, students complete a first work-term of six months, supplemented by concurrent academic work, a second six months term as a full-time student, and a final work-term of six months also supplemented by concurrent academic work. Normally students completing the program will proceed to full-time, career employees of the employer with which the work-terms were served.

For further information, contact the Director of Cooperative Education, telephone (205) 895-6741.
Vocational Rehabilitation
Students with a physical disability may obtain grants-in-aid covering fees, books, and supplies through the Vocational Rehabilitation Service, which is supported by federal and state appropriations. For further information, write to: Alabama Vocational Rehabilitation Service, 407 Governors Drive, S.W., Huntsville, Alabama 35801 or the Director of Vocational Rehabilitation, Room 416, State Office Building, Montgomery, Alabama 36104.

Medical Services
UAH students who need a family physician may become patients of the UAH Family Practice Center by going to the UAH Ambulatory Care Center in the Huntsville Medical District to complete the intake forms. All UAH students registering as patients are required to have valid UAH identification cards.

UAH students who are planning to become patients of the UAH Family Practice Center are urged to register before they actually need medical care. UAH students who are not already registered patients of the Family Practice Center are eligible for emergency medical care only. Emergency care for UAH students who do not have a doctor is available from 8 a.m. to 5 p.m. Monday through Friday by phoning 536-5511.

All patient care services provided by UAH School of Primary Medical Care are on a fee-for-service basis.

Miscellaneous
Some businesses and industries provide tuition assistance to employees attending UAH. An employed student should consult the personnel office of his place of employment to determine its policy regarding tuition assistance.

Graduate Record Examination Fee Waiver Program
UAH is a corporate institute for the Graduate Record Examination (GRE) Fee Waiver Program. These waivers are limited to senior students receiving financial assistance through the university whose parents' financial contribution is estimated to be zero for the applicant's senior year in college. Information and fee waiver certificates may be obtained in the Office of Financial Aids.

Veterans Affairs
UAH offers a full range of services to the student attending under the Veterans Administration Educational Assistance Program. These services include veterans' advisement, educational loans, and the Veteran Tutorial Program.

Under the current Veterans Educational Assistance Programs, which affect most veterans, the veteran receives an allowance directly from the government. The veteran is responsible for paying fees directly to the university and meeting payment deadlines applicable for all students.

The Veterans Administration will make full payment only when the student carries a full academic load. To facilitate the prompt and accurate reporting of the student's status and course load, the veteran must complete a brief form
every term enrolled. This form must be turned in to the veterans affairs clerk in the Office of Admissions and Records, Room 232, Morton Hall.

It is the student's responsibility to remain in good standing with the Veterans Administration and to respond to notification of changes in regulations. For additional information, write to: Veterans Administration Regional Office, 474 South Court Street, Montgomery, Alabama 36104.

Many students who are children of veterans of World War I, World War II, or the Korean War may be eligible for benefits under the War Orphans Educational Assistance Act (PL 634). Write the nearest Veterans Administration Regional Office for additional information.

The Alabama G.I. and Dependents Education Benefits Act grants tuition assistance to eligible veterans, their children, widows and wives. Tuition is paid directly to the school. For additional information, write to: Assistant to the Director, Department of Veteran's Affairs, P.O. Box 1509, Montgomery, Alabama 36102.

**University Housing**

University Housing is available to any student, married or single, who has been admitted to the university. Priority will be given to students who have signed up for a full-course load. A married couple is eligible if either husband or wife is or will be a university student.

All townhouse and one-bedroom efficiency apartments will be primarily available for married couples and handicapped students. (Townhouses are for married couples with children and efficiencies are for handicapped students and married couples without children). If, after regular assignments are made, some of the apartments remain available, single students will be able to rent these units. The single student in this case will be responsible for the entire apartment, payment of all related housing charges, and finding an eligible roommate (if a roommate is desired). Single students interested in this accommodation should indicate so on the housing application.

Within University Housing there are two housing complexes: the north area (off-campus) and the south area (on-campus). The north area of housing consists of two- and three-bedroom townhouse apartments (furnished and unfurnished) and are located a short distance from the UAH campus. All apartments are air-conditioned, carpeted, and equipped with overhead lighting, gas ranges, and electric refrigerators. All furnished apartments have window coverings and basic living, dining, and bedroom furniture. All of these apartments have hook-ups for washers, but none for dryers.

In the south area there are three-bedroom suites and one-bedroom efficiency apartments. The three-bedroom suite can accommodate up to six people. Each unit has a living room, a kitchen-dining area, three bedrooms, and a double bathroom. All suites are furnished with a couch, two end tables and two lounge chairs in the living room. A table and chairs are in the dining area, and single captain's beds (80 inches long), study desks and chairs, and night stands are in the bedrooms. Each suite is air-conditioned, carpeted, and equipped with an electric range, refrigerator, and Levolor blinds.

The one-bedroom efficiencies are air-conditioned, carpeted, and equipped with an electric range, refrigerator, and Levolor blinds. Furnished apartments
have a couch, two end tables, and lounge chair in the living room; dining table and chairs in the dining area; and double bed, night stand, study desk, and chair in the bedroom.

In the south area there is also the UAH infirmary which is an apartment converted to house the medical staff and equipment. In addition there are laundry rooms located on the premises equipped with several washers and dryers in both housing areas.

Items that students need to bring with them are: linens (in the south area, extra-long fitted sheets are needed for the 80 inch mattresses), dishes, pots, pans, TV's, stereos, and lamps, if desired.

Assignments are made on the basis of the application date; first come, first served. Students may choose roommates, or the Housing Office will assign roommates who have similar characteristics. Both apartment areas are located within walking or bicycling distance of the campus and are near supermarkets, drugstores, movie theatres, restaurants, and department stores. UAH housing is administered by the Housing Director in the Division of Student Affairs, and student staff members (resident assistants) live in the apartment areas to help students with any academic, maintenance, or personal problems that may occur. It is the desire of the housing office to aid in a student's adjustment to UAH and we wish to be of assistance to all our housing residents.

Since UAH housing is limited, students interested in University housing should apply at least one academic term before enrolling. A $50 deposit will reserve a place in either north or south area of University housing. Housing policies and regulations are contained in the housing brochure and in the rental agreement that residents sign. Housing application forms and additional information may be obtained from: Housing Office, University of Alabama in Huntsville, Huntsville, Alabama 35899 (205) 895-6108. If you would like a tour of the housing facilities, please contact the Housing Office and this can be arranged.

Preschool Learning Center

There is an on-campus preschool provided by the University Preschool Parents Association to accommodate the students, faculty, and staff, as well as the public. A stimulating environment is provided daily at the center, according to a fundamental philosophy that learning should be fun. In addition to cognitive development, the center focuses attention on the social, physical, and emotional development of the children enrolled. The center is staffed by professional teachers and well-qualified teacher aides, each of whom is attentive to the needs of individual students. The center has several attendance plans to accommodate the various schedules of student parents. Call 837-9553 for information.

University Union

The Union houses student lounges, meeting rooms, a game room, offices for Student Affairs, Student Government Association, Exponent, the bookstore, and food service. The Union has become the primary student programming facility on campus, and consequently numerous activities are continually occurring throughout the week.

Lounges

A color TV lounge is on the second floor. Since ample space and tables are provided, many students also study in the lounge while watching TV.
Game Room
A game room is located in the multi-purpose area and contains a variety of video and pinball entertainment of games for the students.

Meeting Rooms
The large multipurpose room on the first floor can accommodate up to 250 people for large meetings and special events. This room is also the primary area where student programs are conducted. A smaller conference room on the second floor accommodates twenty-five people and is primarily used by clubs and organizations to hold weekly meetings. These areas may be reserved by contacting the Department of Student Life, 895-6445.

Offices
Offices for the Student Government Association, Exponent, and Student Affairs are located on the second floor of the Union.

Union Cafeteria Concessions
The university food service, located in the Union, provides a convenient dining facility for the campus community. The cafeteria is open Monday through Friday offering the following selections: short order breakfast, soup, salad, deli sandwiches, and hot food service at noon. When there are programs in the Union, the food service concessions are open to the public.

Student Activities
Films, lectures, dances, mini-concerts, cabaret, and dramatic productions are held in the multipurpose room weekly for students’ enjoyment and participation.

Textbooks and Supplies
The Book Nook, in the Union, is a full-service college store operated for the convenience of the UAH community. In addition to providing textbooks for all courses taught on campus, the Book Nook offers an extensive selection of reference books and study aids. The store also sells campus clothing, records, gifts, and has the most complete line of collegiate school supplies in the city. The Book Nook features special-order services for books, records, class rings, and Greek jewelry. There are no service charges to UAH students, faculty, and staff for special orders.
UAH students may sell used textbooks to the Book Nook for cash at any time. Premium purchase rates are offered, however, at the end of each term.
Regular hours for the Book Nook are: Monday and Tuesday 9:00 a.m. to 6:00 p.m. and Wednesday through Friday 9:00 a.m. to 5:00 p.m. Special evening and weekend hours for the first week of classes are announced each term.
Student Government Association

The Student Government Association promotes the welfare of students in all areas of university life. Its primary purpose is to help improve the educational environment. This includes promoting academic innovation and working closely with faculty and administration toward making desirable changes in institutional policies.

The SGA is responsible for developing and sponsoring programs which will enrich the student's cultural, intellectual, and social life. Each student enrolled at UAH is automatically a member of SGA. An executive branch and a sixteen-member legislature are responsible for carrying out the official business of the organization.

The association sponsors many student services such as health insurance, a store discount plan, special rates for community cultural events, and information about local services. It also includes the following student activity programs: entertainment series, film series, dance theater, Free University, symposium and lecture series, and the drama board. The SGA provides students with a grievance officer, a used textbook exchange, and a telephone information service "Source." The number is 895-6666.

Student Organizations

Alpha Phi Sigma

The purpose of this organization is to recognize and promote high scholarship among students actively engaged in collegiate preparation for professional services; to keep abreast of the advances in scientific research; to elevate the ethical standards of the Criminal Justice professions and to establish in the public mind the benefit and necessity of education and professional training.

Alumni Student Council

The purpose of the Alumni Student Council is to act as a representative of the student body and to aid the UAH Alumni Council in its school projects.

American Institute of Chemical Engineers (AIChE)

The objective of AIChE is to contribute to the development of chemical engineering at UAH through activities involving the faculty and student members while promoting the professional development of its members by
programs relating the student organization to local, regional and national AIChE activities. Membership is open to all undergraduate chemical engineers.

American Society of Civil Engineers (ASCE)

The purpose of the ASCE Student Club is to promote the profession of civil engineering among students through organized programs and projects. Professional and community oriented activities provide an opportunity for students to learn the meaning of professionalism. Scheduled meetings include businesses, speakers, field trips, and social activities.

American Society of Mechanical Engineering (ASME)

The purpose of ASME is to aid mechanical engineering students in their personal and professional development. Membership is open to all engineering students. Activities include speakers, business meetings, projects, field trips, and social activities.

Baptist Student Union

The Baptist Student Union exists for the purpose of providing an outlet for Christian expression, discussion, and study. Membership in the BSU is open to any university student. Its student center is adjacent to campus on Holmes Avenue.

Biology Club

The objective of the Biology Club is to promote interest and research in biological sciences. Any person enrolled as a full-time or part-time student and interested in biology is eligible for membership. The meetings are called at random by the president. Activities are aimed at giving the members a first-hand look at science in its natural environment and include field trips, lectures, and films. The club also offers aid on research projects.

Black Student Association

The purpose of the Black Student Association is to promote unity and black cultural awareness among students, to foster the needs and interests of minority students of UAH, and to provide charitable services to the community.

Bowling Club

The goal of the Bowling Club is to promote the game of American tenpins by uniting the bowlers of UAH, encouraging sportsmanship, enforcing playing rules, and fielding men’s and women’s intercollegiate teams in SIBC.

Business Club

The Business Club is open to all students interested in business-related careers. The club conducts a job fair for prospective graduates each year. Social events and programs of interest to students in all business fields are provided.

Camera Club

The purpose of the Camera Club is to provide a means for the UAH community (students, faculty, staff, and alumni) to further their interest in photography. It is anticipated that club members will be active in making, exhibiting, and acquiring photographs.
Campus Ministry Association
The CMA is a cooperative effort by a number of student denominational organizations to promote activities and programs which provide spiritual enrichment opportunities for students.

College Bowl Team
The College Bowl Team competes yearly in several intercollegiate contests of knowledge and quick recall and also sponsors intramural and high school tournaments on campus. College Bowl competition fosters broad and deep familiarity with numerous subjects, rapid reflexes, and good sportsmanship.

Christian Students Organization
This organization was founded to promote spiritual growth and development among college students.

Circle K
Circle K, a service organization for men and women students, is sponsored by the Metropolitan Kiwanis Club of Huntsville. It is open to all students interested in service to the community. Past interests of the club have included disadvantaged youth, ecology, minority concerns, and drug education. Circle K holds weekly meetings and occasional social events.

Combat Arts Club
The purpose of the Combat Arts Club is to promote sport competition and excellence in the Martial Arts, while improving health, coordination, and endurance through rigorous exercise.

Collegium Musicum
The purpose of this society is to recognize students' interests and participation in the field of music and to encourage and support excellence in the musical activities of both the university and the Huntsville communities. Membership is open to all students majoring or minoring in music.

Criminal Justice Club
The UAH Criminal Justice Club is organized to bring awareness to the university and local communities of the criminal justice system and its importance. It works to provide opportunities to explore advanced educational programs and to expose members to innovative ideas concerning resources from local representatives on site visits.

Depth Chargers
The objectives of the club are to promote the sport of Scuba Diving on the UAH campus; to promote further education and advancement in safety and scuba diving techniques; to create organized activities for all levels of scuba diving; to provide a vehicle for self-help clinics, with the assistance of the P.E. diving faculty; to encourage unity among divers; and to promote membership in the club by acquainting the student body with its ideas, purposes and objectives.

Engineering Society
The Engineering Society is a service organization composed of students and faculty in engineering, allied sciences, and mathematics. Regular membership
is open to engineering faculty and students, and associate membership is open to the faculty and students of the sciences and mathematics.

The society meets twice a month to discuss current engineering developments and to participate in special programs of science and engineering enrichment. The meetings provide a common ground for communication between faculty and students leading to a more complete understanding of engineering practice. The Engineering Society also works with the Dean of the School of Engineering in solving problems related to curriculum, class scheduling, professional licensing, and the like.

Episcopal Student Fellowship
The primary objective of the Episcopal Student Fellowship is to provide a ministry to any member of the university community who may have need of or desire Christian fellowship or counsel. Membership in ESF is open to any university student.

Frisbee Club
The objectives of the Frisbee Club are to promote the sport of Frisbee on the campus and to establish intramural and intercollegiate competition.

German Club
The German Club wants to promote interest in the usage and study of the German language, in the cultures and literatures of the German-speaking countries, Germany, Austria, Switzerland, and in international exchange and understanding. The membership is open to all faculty, staff, and students of the various disciplines. The club meets once a month for specific programs, related to the above stated goals and for more informal activities at additional times.

Gymnastics Club
This club is set up with the intent of offering an opportunity for interested people to develop and increase their gymnastic skills and to promote competition with other teams of comparable ability.

History Forum
The History Forum is an informal group whose membership includes all history faculty and interested students from various disciplines. The forum meets monthly on Sunday evenings in faculty homes to discuss a preselected issue of current interest. Programs are jointly presented by faculty members and student volunteers. Dues and profits from fund-raising projects are used to equip the history seminar room at the university.

IEEE (Institute of Electrical and Electronic Engineers)
The Student Chapter of IEEE is a technical/professional organization for students in Electrical Engineering. Monthly meetings feature guest speakers, films, projects, or facility tours acquainting members with various aspects of electrical engineering. Membership is open to all undergraduate and graduate students in Electrical Engineering who are at least half-time students.
Institute of Industrial Engineers
The object of this chapter is to promote the profession of industrial and systems engineering through the organized effort of this group in study, research and discussion. Monthly meetings featuring guest speakers, films, or plant tours are presented to acquaint the student body with the ideas, purposes, and objectives of industrial engineering. Membership is open to all full-time undergraduate and graduate students in industrial and systems engineering.

Karate Club
The objectives of the Karate Club are to promote the sport of karate, to create organized competition for all levels and to encourage unity among those players interested in attending state, regional, and national tournaments.

Lancers
Several outstanding students are selected each year for their leadership and achievements to serve as public relations representatives of the university. Lancers greet and introduce the university to many exciting visitors and play an important role in helping major events on and off the campus run more smoothly. Any student interested in being considered for membership should contact the Office of University Advancement.

Le Cercle Français
The purpose of Le Cercle Français is to promote understanding and appreciation of French culture and to encourage students to study and speak French. The club meets once a month in a social milieu for discussions and programs.

Madison County Young Republican Club
The purpose of this club is to develop all Young Republicans into an intelligent, dynamic, and cooperative Republican group, to promote in every honorable way the platform and candidates of the Republican party, and to represent the views of young people to the leadership of the party.

Math Club
The purpose of the Math Club is to increase the influence of the university in mathematics, to promote good fellowship, and to offer services to students and faculty in the field of mathematics. The club is open to all students and faculty.

Some of the current activities of the club are furnishing lecturers to speak about mathematical and related topics, providing free tutorial services for mathematics students, aiding in public relations activities of the university, and sponsoring an annual mathematics competition for high school students in the area. The club holds biweekly meetings and occasional social events. Its members are constantly seeking new ways and ideas to promote increased interest in and understanding of mathematics.
Medical Careers Association
The Medical Careers Association is for students who intend pursuing a career in the health field, which includes premedical and predental students as well as those in nursing and allied health sciences. The purpose of the association is to help its members fulfill the entrance requirements of the various professional schools across the nation and to acquaint them with opportunities in the health fields. Interviews with and lectures by admission officers of professional schools, programs about the latest advances and opportunities in the health fields, and guidance in the selection of courses of study are some of the services provided by the association.

Medical Student Association
The Medical Student Association was created to provide a forum for the members of the School of Primary Medical Care. This organization seeks to develop opportunities for personal growth and to foster an atmosphere of mutual respect between students and community.

Music Educators National Conference
This organization seeks to acquaint its members with the music profession and to work to increase interest, knowledge, and productivity in all areas of music education.

The National Society of Black Engineers
The National Society of Black Engineers is dedicated to the development of intensive programs for increasing black and other ethnic minority participation in the field of engineering. These programs are both within and outside the university community and serve to strengthen the relations between local government, industry, and the black and other ethnic communities. Membership is open to all students.

Nursing Students' Association
The purpose of the Nursing Students' Association is to provide means to aid nursing students in realizing professional goals and to provide interaction and fellowship among clinical and preclinical nursing students. Any student enrolled in nursing at the university is eligible for membership. Through this club, students participate in local projects and programs as well as those of the state and national nursing students' associations.

Political Science Club
The purpose of the Political Science Club is to promote interest in politics and policies at the domestic and international levels and to provide a means for students to meet each other and the PSC faculty. Open to anyone with an interest, the club holds regular business meetings and occasional discussions at faculty members' homes. Past activities have included lectures, symposiums involving the Huntsville political community, and various social events.

Presbyterian Faith and Life Fellowship
The Presbyterian Faith and Life Fellowship provides a ministry to any member of the university community. Membership is open to any student interested in study, worship, or counseling in community life.
Racquetball Team Club
The club offers both the serious competitor and the beginner a chance to compete against other players. It travels to most regional tournaments, sponsors its own events, and has two part-time coaches for skill development. Membership is open to all students and is one of only three in the U.S. with funds for a complete operation.

Slavic Club
The Slavic Club is for students who wish to further their understanding of Slavic cultures. Although the emphasis is on Russia, the whole spectrum of Slavic nations is studied. At club gatherings, the members use various media to investigate different facets of their interests.

The Society of Physics Students
The Society of Physics Students promotes contact between fellow students and faculty and provides a medium for interaction with the local physics community and other universities. Students in SPS pay minimal national dues and receive *Physics Today*. Any interested student may join.

The Society of Women Engineers
The Society of Women Engineers is a professional, non-profit, educational service organization. Objectives of the Society are to inform young women, their parents, counselors, and the general public of the qualifications and achievements of women engineers and the opportunities open to them, and to encourage women engineers to attain high levels of education and professional achievement. The Society of Women Engineers administers several award certificate and scholarship programs.

Students’ International Meditation Society (SIMS)
SIMS offers intellectual knowledge to balance the experiential growth gained through the practice of the Transcendental Meditation—TM-Sidhis technique and allows for social activities with fellow meditators. SIMS also offers periodic introductory lectures for other people wishing to learn the TM technique.

Student National Education Association
The UAH chapter of the student NEA is for students who plan to be educators. One of the association’s purposes is to involve students in the issues and processes of education before they begin their careers. Any undergraduate education student may join.

UAH Amateur Radio Association
The UAH Amateur Radio Association, founded in the spring of 1973, seeks to promote interest within the university and the community in amateur radio operations and programming. Full membership is open to any university student who possesses an amateur radio license. Associate membership is open to anyone having an interest in amateur radio. The association maintains and operates a station in Room C-5, Research Institute.
Academic Honors Societies

Administrative Science Honorary
The Administrative Science Honorary is for students majoring in one of the disciplines of the School of Administrative Science. Its purpose is to recognize, promote, encourage, and maintain academic excellence and to provide an opportunity for personal growth through participation with the academic community and professional involvement beyond the classroom. Standards for membership are completion of 60 semester hours (the last 30 at UAH), a cumulative grade point average of 3.5 or above, and recommendation by a member of the Administrative Science faculty.

Alpha Epsilon Delta
The UAH chapter of Alpha Epsilon Delta, the national premedical honor society, was established on campus in the fall of 1978 and was chartered in the spring of 1979. Membership in Alpha Epsilon Delta is an honor bestowed in recognition of superior scholastic achievement and affords the student an opportunity to develop initiative, leadership, and self-education by participating in the activities of the chapter.

Alpha Kappa Delta
The Epsilon of Alabama chapter of Alpha Kappa Delta was chartered by the national sociology honorary society in the spring of 1976. It thus became the fifth chapter of this society in this state. Membership in Alpha Kappa Delta is limited to students who have maintained a high standard of excellence in their courses of study in sociology and who show serious interest in this academic field. The candidate for membership in the chapter must have completed at least 10 credit hours in sociology, must have at least a general scholastic average of B on all sociology courses, and must be in the upper 35 percent of the class. Election to Alpha Kappa Delta shall be without regard to race, creed, sex, or, national origin. A $12 fee pays for a lifetime membership.

Alpha Lambda Delta
The UAH chapter of Alpha Lambda Delta, national scholastic honor society for freshmen, was installed in the fall of 1974. The purposes of the society are to encourage superior scholarship attainment among students in their first year in institutions of higher education, to promote intelligent being and a continued high standard of learning, and to assist students in recognizing and developing meaningful goals for their roles in society. To become a member, a student must earn a scholastic average of 3.5 during the first, second, or third quarter of enrollment.

Beta Beta Beta
The Mu Omega chapter of the national honor society for biology was installed in May 1978. The purpose of the society is to provide recognition for students of the biological sciences who achieve scholastic distinction. The society promotes an interest in and furthers the objectives of science. Active members are undergraduate majors who have completed three courses in biology with a B average.
Eta Kappa Nu
The Theta Eta (UAH) Chapter of Eta Kappa Nu was chartered on April 29, 1978. The objectives of Eta Kappa Nu are to honor those students of Electrical Engineering who have excelled in scholarship, leadership, and exemplary character and to unify them with graduates and faculty who have attained prominence in the field of Electrical Engineering. Membership is open by chapter invitation only to graduates, faculty, professionals, juniors in the top fourth of the electrical engineering class, and seniors in the top third of the electrical engineering class.

Kappa Pi
The UAH chapter of Kappa Pi, international college art honorary fraternity, is Epsilon Tau. It was installed at UAH in the spring of 1972. Membership is open to junior and senior art majors with above-average academic records and a B average in art courses. Art minors with 15 hours of art courses are also eligible. The chapter sponsors art programs which are open to the community, exhibitions, and projects undertaken jointly with the other chapters.

Omicron Delta Epsilon
The objectives of Omicron Delta Epsilon, international honor society in economics, are recognition of scholastic attainment in economics, the honoring of outstanding achievement in economics, the establishment of closer ties between students and faculty in economics within and among colleges and universities, and the publication of the official journal, the American Economist. Omicron Delta Epsilon is a member of the Association of College Honor Societies. The UAH chapter was approved in February 1973.

Omicron Delta Kappa
The purpose of the Omicron Delta Kappa Society is to recognize individuals who have attained a high degree of leadership in collegiate and related activities, to encourage them to continue along this line, and to inspire others to strive for similar conspicuous attainment; to bring together representative individuals in all phases of collegiate life and thus create an organization which will help mold the sentiment of the institution on questions of local and intercollegiate interest; and to bring together members of the faculty and student body of the institution on a basis of mutual interest, understanding, and helpfulness.

Phi Alpha Theta
UAH has a chapter of Phi Alpha Theta, international history honorary society. Membership is open by invitation only to history students who have completed a minimum of 12 hours in history with a grade-point average of 3.5 and an overall average of 3.0 in all other courses.

Phi Delta Kappa
A number of faculty and staff members are actively involved in the Huntsville chapter of Phi Delta Kappa, national leadership fraternity in the field of education.
Phi Kappa Phi
The primary objective of the national honor society of Phi Kappa Phi is the recognition and encouragement of superior scholarship in all academic disciplines. The society is convinced that in recognizing and honoring those persons of good character who have excelled in scholarship in whatever field it will stimulate others to espouse excellence. Moreover, the society feels that it serves the interests of the student capable of excellence by insisting that to acquire a chapter of Phi Kappa Phi, an institution provide the atmosphere conducive to academic excellence.

Phi Sigma Iota (Foreign Language)

Pi Tau Sigma
Pi Tau Sigma is the national Mechanical Engineering Honor Society. The purposes of Pi Tau Sigma are to foster the high ideals of the engineering profession, to stimulate interest in coordinate departmental activities, to promote the mutual professional welfare of its members, and to develop in students of mechanical engineering the attributes necessary for effective leadership. Eligibility extends to the top quarter of the juniors and the top third of the seniors in mechanical engineering.

Psi Chi
Psi Chi is a national recognition society for students in the field of psychology. The purposes of Psi Chi are to encourage, stimulate, and maintain scholarship of the individual members in all fields, particularly in psychology, and to advance the science of psychology. To achieve these goals Psi Chi offers a wide range of programs at the local, regional, and national levels. The requirements for admission are a 3.0 overall grade-point average and a 3.0 in psychology, and 12 hours of psychology for a minor or 15 hours for a major.

Sigma Pi Sigma
The Sigma Pi Sigma honorary society operates within the Society of Physics Students. Membership is based on general scholarship. An overall GPA of 2.75 and a GPA of 3.2 in at least 5 courses in physics are required for membership in Sigma Pi Sigma.

Sigma Tau Delta
The UAH chapter of Sigma Tau Delta, a national English honorary society, is Upsilon Mu. Its purposes are to assist in developing, maintaining, and promoting literary and educational activities for the students and the alumni of the chapter, as well as the entire university and civic community. Membership is open by chapter invitation only to English majors and minors of junior standing who have a 3.0 grade-point average.

Cultural and Entertainment Programs
The University Arts Series
The University Arts Series, jointly supported by the SGA and the UAH faculty and administration, presents performances and residency programs to stimulate and complement the cultural interests of the students and the univer-
sity community. Events are selected and managed by the UAS committee of students and faculty. Students are admitted free to events by picking up a ticket at the Morton Hall information desk before each event. UAH students may also attend various cultural events in Huntsville free throughout the school year. Information concerning these many opportunities is available at the SGA office in the Union.

SGA Film Series
The Film Series, free to UAH students, shows art, foreign, contemporary, and classic movies weekly. The intent behind the series is to entertain as well as provide the student with a wide cultural background in films and to give him an opportunity to investigate the social and economic importance of film as an art form.

SGA Symposium and Lecture Series
The Symposium and Lecture Series, in bringing a variety of speakers to the campus, serves as an extension of the classroom. At these programs the students, faculty, and staff have opportunities to discuss contemporary matters with authoritative personalities. All students are encouraged to attend the programs and actively participate in the series.

SGA Entertainment Series
The Entertainment Series sponsors dances, concerts, and social activities. Students are admitted by their I.D. cards except in rare cases when there is a nominal charge. All students are encouraged to participate in these weekly activities.

SGA Drama Board
The UAH Theater is a student group administered by the SGA Drama Board. The group’s goal is to produce theater for UAH students with UAH students. Membership is open to any currently-enrolled student interested in theater. Each year a broad selection of plays is presented. Recent productions have included *You Can’t Take It With You*, *Dracula*, and *The Pajama Game*.

UAH Music Ensembles
All musical organizations are open to all students, music and non-music majors. A student should be able to make a place for himself in some performing group, regardless of his musical background and tastes. Credit is offered for most ensemble experience, and participation may be repeated with approval of the conductor.

Choral Organizations
UAH Choir
The choir performs choral literature of the great masters of music history as well as folk music of various countries. Attendance at all rehearsals and performances is required. Audition with conductor is required.

Premier Singers
The Premier Singers is a spirited group of young people who perform popular music and provide light-hearted entertainment for the campus and community. No audition is required.
Huntsville Village Singers
The Village Singers is a small, elite group of mixed voices which performs madrigals and choral chamber music as well as choreographed tunes and medleys from Broadway and Hollywood. This group was selected for USO overseas tours in 1972 and 1974. Audition with conductor is required.

Choral Union
The choral organizations are annually combined to form the Choral Union, which performs outstanding choral works with the Huntsville Symphony Orchestra and other instrumental groups.

Summer Chorus
The Summer Chorus is a group of mixed voices singing a wide variety of popular and serious choral music to satisfy the tastes of all students.

Music-for-Awhile Ensemble
Normally offered winter term only in conjunction with the Huntsville Chamber Music Guild, the Music-for-Awhile Ensemble is a solo ensemble specializing in early and contemporary music.

Instrumental Organizations
Chamber Ensembles
A widely varied group of instrumentalists, preparing literature of the baroque, classic, romantic, and contemporary periods. Each ensemble is coached by a music faculty member. Permission of the Department of Music Chairman is needed.

Huntsville Symphony Orchestra
The Huntsville Symphony Orchestra, a semiprofessional blend of university and community talent, prepares six formal concerts each year. Four international artists perform with each annual concert series. The orchestra rehearses Monday and Friday from 7:30 to 10:00 p.m. Audition with conductor is required.

UAH Jazz Workshop
A workshop experience providing students with instruction in jazz arranging and composition and in improvisation. Performance of both written and improvised jazz is stressed. Audition with instructor is required.

UAH Wind Ensemble
A select group of experienced bandsmen who perform the best available music literature for wind ensemble and concert band. The ensemble rehearses Wednesday from 7:00 to 9:30 p.m. Attendance at all rehearsals and concerts is required. An audition with the conductor is also required.

Summer Band
The Summer Band provides an opportunity to rehearse and perform band music of a somewhat lighter nature. Audition with conductor is required.

University Brass
A musical organization for the rehearsal and performance of selected ensemble literature for brass instruments. Size varies from trios to large brass ensembles. Audition with instructor is required.
UAH Pep Band

The Pep Band is a musical organization of students that promotes spirit and enthusiasm at a variety of athletic events. Members and scholarship recipients are chosen by audition and may elect to enroll in the group for class credit.

Intercollegiate Athletics

UAH currently sponsors intercollegiate athletic programs in men’s and women’s basketball and soccer. Participation in these programs is open to any qualified student. Intercollegiate teams are affiliated with the National Association of Intercollegiate Athletics (NAIA) and the Southern States Conference (SSC).

Basketball (Men)

In its nine-year history, the men’s basketball program has become recognized as a perennial powerhouse in its conference as well as nationally. In addition to playing a full Southern States Conference schedule, the Chargers traditionally play rugged non-conference competition that has included such NCAA Division I opponents as Indiana State, Western Kentucky, Tennessee-Chattanooga, and Morehead State. The Chargers have won or shared the conference championship four times and have also won the conference tournament four times. Playing in what is recognized as one of the most powerful districts in the country, the Chargers have won the district championship on three occasions, qualifying them for participation in the national tournament. The 1978 team was chosen to represent the United States in two international tournaments played in Brazil. The 1980-81 Charger basketball team finished second in the NAIA National Tournament, losing in overtime.

Basketball (Women)

UAH offered competitive intercollegiate basketball for women beginning with the 1977-78 season. The team is affiliated with the National Association of Intercollegiate Athletics (NAIA) and the Southern States Conference. The Lady Chargers have qualified for the state tournament for five consecutive years and won district titles during the 1980-81 and 1981-82 seasons. The 1981-82 Lady Charger team posted a 22-8 record and finished 13th in the NAIA by finishing as runners-up in the Area 5 Tournament.

Soccer

In its nine years of NAIA competition, the UAH soccer team has gained the reputation as one of the nation’s premier teams, competing against soccer powers like Clemson, Alabama A&M, and Quincy College. The team has qualified for NAIA National Tournament competition for seven consecutive years and on five occasions has reached the final eight, finishing second in 1978 and fourth in 1980 and 1981. During the 1977 and 1978 seasons, UAH was chosen to be the host for the NAIA National Tournament. A highlight of the 1980 season was a nationally televised match on ESPN against archrival Alabama A&M University. Over 7,000 spectators plus a national television audience watched UAH (the number-one-ranked team in the NAIA) and Alabama A&M (the number-one-ranked NCAA Division One school) battle to a 2-2 double overtime tie.
Hockey

The UAH Hockey Club was founded in the fall of 1979. During its three-year existence, the hockey team has experienced phenomenal success, compiling an 85-4-2 record while winning three consecutive Southern Collegiate Hockey Association (SCHA) championships and three consecutive SCHA Conference Tournament Championships. The 1981-82 team took the national club title by defeating Southern Methodist in the JOFA Invitational Club Hockey National Championship Tournament at the University of Colorado campus in Boulder. Starting with the 1982-83 season the team will compete in the Central States Collegiate Hockey League and will be under the direction of the first full-time hockey coach employed by a southern school. Competing against schools like Marquette, Iowa State, and the University of Illinois, the Chargers play all of their home matches in the beautiful 8,000 seat von Braun Civic Center.

Club Sports

Racquetball Team Club

A team club offers both the serious competitor and the beginner a chance to compete against other players. It travels to most national tournaments, sponsors its own events, and has two part-time coaches for skill development. Membership is open to all students and is one of only three in the U.S. with funds for a complete operation.

Rowing

Rowing, the oldest sport at UAH, began in 1965. The rowing team is a member of the Southern Intercollegiate Rowing Association (SIRA), the National Women's Rowing Association (NWRA), and the United States Rowing Association (USRA). The men's and women's crews compete against schools such as Michigan State University, Notre Dame University, University of Tennessee, University of Minnesota, University of Virginia, and Florida Institute of Technology. The crews participate in several major regattas each year, during both fall and spring quarters, such as the Dust Bowl Regatta in Oklahoma, the Head-of-the-Charles in Boston, and the Governor's Cup in West Virginia. In the past four years the crews have placed in the top six of over 20 teams in the SIRA Championship, winning the men's novice eight division in 1980. The 1972-73 men's lightweight four-oared crew placed first and won the Doc Bradley Trophy of the Dad Vail National Small College Championships in Philadelphia. From 1980-82, UAH crews have consistently placed in the top five at the Dad Vail Championships.

Tennis (Men's & Women's)

UAH offers competition in tennis at the club level for both men and women. Teams are basically organized by interested students and the teams compete informally against area junior colleges and four-year colleges.

Intramural Sports Program

The Intramural Sports Program serves the recreational needs of UAH students through a planned program of intramural athletics and other forms of recreational activities. It provides opportunities for the development of
positive attitudes toward recreational activities throughout life, thus deriving optimum benefits of enjoyment, health, social contacts, and sportsmanship. The philosophy of intramural activities at UAH is based on the concept that students should have freedom of choice and responsibility for sharing in planning, supervising, and administering the program.

All students and members of the faculty and staff are eligible to participate in intramural activities. The team sports include basketball, flag football, softball, and volleyball. The individual sports which are offered are bicycling, cross-country races, horseshoes, racquetball, swimming, table tennis, tennis, and weightlifting.

Fraternities and Sororities
There are seven chartered national social fraternities and sororities on campus. The three fraternities are Alpha Tau Omega, Delta Chi, and Pi Kappa Alpha. The four sororities are Delta Zeta, Kappa Delta, Delta Sigma Theta, and Chi Omega. For more information about them, contact the Department of Student Life, 895-6445.

Spirit Organizations
Cheerleaders
The UAH Cheering Squad has 12 members with a proportionate ratio of men and women. The primary purpose of the cheerleaders is to promote spirit, enthusiasm, and support for intercollegiate athletics on the campus. Squad membership is determined by a panel of judges during clinic and tryout sessions conducted each spring. All cheerleaders must be students who are currently enrolled as freshmen, sophomores, juniors, or seniors and must maintain a minimum of a 2.0 (C) grade-point average.

Pep Band
The UAH Pep Band is a musical organization of students that promotes spirit and enthusiasm at a variety of athletic events. Members and scholarship recipients are chosen by audition and may elect to enroll in the group for class credit.

Student Publications
The official student newspaper, The Exponent, is edited and managed by UAH students with the advice of the joint student-faculty publications board. The paper is published weekly except during exams and holidays. All students are eligible for staff membership.

The Pegasus is the yearbook which is edited and managed by students with the advice and general direction of the publications board.

The Student Government Association publishes a student directory and a calendar of student activities and campus events which may be obtained by contacting the Student Government Office in the Union.
Commencement

The signal event of the student’s academic program is commencement. Twice each year, at the end of the spring and fall terms, the university community conducts a special convocation of scholars, family, and friends to celebrate the completion of degree requirements by our graduates. These academic ceremonies in full regalia also symbolize the institution’s distinctive mission to engage in teaching, research, and public service.
Academic Advisement and Information Center

Academic advising is available to students in the Academic Advisement and Information Center, in advising offices in the Schools of Nursing and Engineering, and in the department or program in which a major has been declared. Special advising is provided in the preprofessional areas of law and medicine; and career counseling is available through the Office of Career Planning and Placement. Freshmen and undeclared majors are advised in the Academic Advisement Center or, in the case of engineering and nursing freshmen, in the advising offices of the Schools of Engineering and Nursing. When students declare a major (AOC), they are assigned a faculty adviser in their major department or program. All students are encouraged to maintain contact with their advisers and to take advantage of the opportunities for academic advising which the University provides.

Currently located in Room 222 of Morton Hall, the Academic Advisement and Information Center is staffed by a team of experienced faculty. They assist prospective and enrolled students in course and program planning, disseminate accurate information about academic programs and procedures, make referrals to appropriate offices and services, and advise and register students during registrations and orientations. Appointments may be made by calling 895-6290.

All freshmen students except those enrolled in the Schools of Engineering and Nursing are required to visit the Advisement Center at least once each term to review their academic progress and to plan their schedule of courses for the next term. These schedules must be signed by an adviser in the AAIC in order to be processed by the Office of Admissions and Records. Undergraduates enrolled as special students must also have schedules validated each term in the Academic Advisement Center as long as they remain in the special-student category. Sophomore students outside of the three professional schools (Administrative Science, Engineering and Nursing) who have not declared a major will be advised in the Advisement Center and will continue to have their registration cards signed by advisers in the AAIC. If students with 45 semester hours are still not prepared to declare majors, they will declare an intention to continue to seek advice from the AAIC.

Prospective transfer students who wish to gain information concerning the general requirements of various undergraduate degree programs may seek the
services of the Academic Advisement Center. These students are further referred to department chairmen who can aid them in program planning in their major fields of interest. Transfer students will be advised and registered at new-student orientations by the appropriate faculty adviser. Once enrolled at the University, transfer students beyond the freshmen level who are not enrolled in the Schools of Administrative Science, Engineering and Nursing are advised by the Academic Advisement Center for the first term. During this term, transfer students will declare a major or declare an intention to continue to seek advice in the Advisement Center.

Academic rules and regulations stated in this catalog are subject to review for extenuating circumstances. Students are encouraged to use the services of the Academic Advisement and Information Center for the appropriate procedure of appeal. Academic appeals originate with the student and will be processed through the student’s major department, the dean of the school, and the Office of Academic Affairs, in that order.

Students beyond the freshman level enrolled in the School of Administrative Science must have schedule cards approved each semester by a faculty adviser in that school. For an appointment, call 895-6024.

General Information Center

The General Information Center currently is located in the lobby of Morton Hall. The staff maintains current information on university activities on and off campus. Interested persons should call about cultural events and other activities connected with the university community. Brochures, application forms, and literature on special events are available at the center. With proper identification, students may obtain a limited number of free tickets to various cultural events on the campus and in the city. The General Information number is 895-6295.

Nondiscrimination Policy

The University of Alabama in Huntsville is committed to equal employment and educational opportunity. Its policy is one of nondiscrimination with regard to any person on the basis of race, color, national origin, religion, sex, or age, and with regard to any otherwise qualified handicapped individual solely on the basis of handicap. This equal opportunity policy extends to the recruitment and admission of students, the recruitment and employment of faculty and staff, and the operation of all programs and activities. Additionally, the university is an affirmative action employer of protected minorities and women.

The foregoing commitment is designated to meet the nondiscrimination affirmative action requirements of applicable federal laws, including the following statutes (with implementing regulations) and executive orders, as amended: Title VI and Title VII, Civil Rights Act of 1964; Executive Order 11246; the Age Discrimination in Employment Act of 1967 and the Age Discrimination Act of 1975; Title IX, Education Amendments of 1972; the Equal Pay Act of 1963; the Rehabilitation Act of 1972; and the Vietnam Era Veteran Readjustment Assistance Act of 1974.
Inquiries or complaints concerning the application to these federal requirements and this policy should be directed to one of the following persons:

Dr. Elmer E. Anderson  
Academic Affirmative Action Officer  
123 Madison Hall  
The University of Alabama in Huntsville  
Huntsville, AL 35899 (205-895-6337)

Dr. Joseph C. Dowdle  
Equal Employment Compliance Officer  
131 Madison Hall  
The University of Alabama in Huntsville  
Huntsville, AL 35899 (205-895-6350)

Confidentiality of Records

The Family Educational Rights and Privacy Act of 1974 is a federal law which protects the confidentiality of student educational records. To implement this law UAH has formulated and adopted a written institutional policy governing the handling of these records. Copies of this policy document are available to students at the Office of Admissions and Records, and it should be referred to for a more comprehensive treatment of this subject than is given in the summary statement here.

Under this law and university policy, a student has a right of access to his educational records and may inspect and review the information contained in them. The term educational record generally refers to any record maintained by the institution directly pertaining to an individual as a student, other than that made by institutional, supervisory, or administrative personnel remaining in the sole possession of the maker; by campus security; or by a physician, psychiatrist, or any other such professional medical personnel. This right of access does not extend to financial information submitted by the student's parents or to confidential letters and recommendations collected under established policies of confidentiality and placed in his files before January 1, 1975. Furthermore, the student may at his discretion waive the right to any confidential letters of recommendation.

If a student believes his records contain inaccurate, misleading, or otherwise inappropriate data, he may bring the matter to the attention of the records official concerned. If by informal discussion with this official the student does not obtain the corrective action desired, he is entitled to a hearing at which he may challenge the item he finds objectionable. The decision of the hearing official or panel shall be final. If the decision is adverse to the student, he may insert in his educational record an explanatory statement relating to the contested item.

A student's privacy interest in his records is further protected by the rule against unauthorized disclosure. The university may not without the student's consent release his educational records or any personally identifiable information contained in them to other individuals or agencies. Disclosure to the following parties, however, is specifically excepted by the Privacy Act from this rule: (a) administrative and academic personnel within the institution who have a legitimate educational interest; (b) officials of institutions in which the
student seeks to enroll; (c) persons or organizations to whom the student is applying for financial aid; (d) accrediting agencies; (e) organizations conducting studies relating to tests, student aid programs, instruction; (f) certain federal and state government officials; (g) any person where the disclosure is required for compliance with a judicial order to proper subpoena; (h) appropriate persons where a health or safety emergency affecting the student exists; and (i) parents of a dependent student. As to some of these parties, additional conditions must be met in order for the disclosure to be allowable in the absence of a written consent from the student. Personally identifiable information will be transmitted by the university to a third party only on the condition that the recipient not permit any other party to have access to it without the student’s consent.

The university may release directory information to others without the necessity of obtaining permission from the student. Directory information is limited to the student’s name, address (local and permanent), telephone number, date and place of birth, major field of study, participation in officially recognized activities and sports, weight and height statistics if he is an athletic team member, date of attendance, degrees and awards received, and the previous educational institution most recently attended. If the student does not wish this information to be released, he may so indicate on the form provided at the time of registration, and the university will withhold it during that particular term. This request for nondisclosure of directory information must be renewed each term.

The following officials have been designated as records officials for student records within their respective area:

Director, Admissions and Records
Director, Academic Advisement and Information Center
Coordinator of Undergraduate Advisement, Administrative Science Programs Coordinator, Administrative Science
Assistant to Dean, Engineering, Lower Division
Dean, Engineering, Upper Division and Graduate.
Chairman, Nursing, Lower Division
Chairman, Nursing, Graduate Program
Director, Continuing Education
Vice-President, Student Affairs
Director, Medical Student Affairs
Director, Financial Aid

A student should make a request concerning his educational records to the appropriate official listed above.

Any student who believes that his rights under the Privacy Act have been violated by the university may notify and request assistance from the Vice-President for Academic Affairs and may file a complaint with the Family Educational Rights and Privacy Act Office, Department of Health, Education, and Welfare, Washington, D.C. 20201.
Marital, Parental, or Temporary Disability Status

The university does not discriminate against any student or exclude any student from its educational program or extracurricular activity on the basis of a student’s sex, marital, or parental status. Pregnancy or related conditions are treated the same as other temporary disabilities. The university may require written approval of a student’s physician regarding participation in an activity or educational program which might adversely affect the safety or health of a student with a temporary disability.

Conduct

A student enrolling in the university assumes an obligation to conduct himself in a manner compatible with the university’s role as an educational institution. The administration reserves the right to establish rules for expulsion and penalties for failure to meet standards of scholarship, character, and health.

All members of the UAH community are subject to the provisions of federal and state statutes and local city ordinances with regard to alcoholic beverages, drugs and narcotics, weapons, gambling, fireworks, and the use of state property. Such laws are fully in force on the university campus and may be enforced by public authorities, as well as campus police. Each person associated with the university is responsible for being aware of and abiding by these laws.

The university has incorporated as its own regulations all existing federal, state, and local laws defining and proscribing criminal. In addition, the following policy applies to the UAH campus community:

1. No alcoholic beverages shall be consumed in any open areas on university property. With the exception of the Noojin House and inside UAH Community Housing Apartments, alcoholic beverages will not be permitted inside any UAH buildings.

2. Narcotics and other controlled substances will not be permitted anywhere on university property except upon prescription by a practitioner (as that term is defined in the Alabama Uniform Control Substances Act) or except by a practitioner or his authorized agent under his supervision, incident to research, teaching, chemical analysis, or professional practice.

3. Firearms or other weapons (including explosives) are not to be brought onto or kept on UAH property by anyone, whether holding a firearm’s license or not, except police officers and other law enforcement officials in the exercise of their lawful duties.

Students who violate any of the foregoing laws, regulations, or policies are subject to university disciplinary action as provided in the UAH Student Judicial Code and/or arrest and prosecution by civil authorities as appropriate. Similarly, faculty or staff personnel who violate these laws, regulations, or policies are subject to adverse employment action, including dismissal, and/or arrest and prosecution as appropriate. Suspected violations of the Student Judicial Code should be reported to the Office of the Vice President for Student Affairs.

Officers in the Office of Campus Security are by statute charged with all the duties and vested with all the power, such as that of arrest, of police officers. Violations of federal, state, or local laws should be promptly reported to the security office and full cooperation given in the discharge of its responsibilities.
Special Services Program

A Special Services Program consisting of tutoring, testing, developmental skills, classes, counseling and advising has been developed to assist students who are intellectually able to do college work but who have poor academic preparation for college. All students who are admitted on probationary status or who are having problems with any of their basic introductory or remedial-level courses should make an appointment with the Director of the Special Services Program as soon as possible following registration. There is much greater probability of success if students apply for help from the program before the third week of the term, and students may be refused admission to the program after this time. The Special Services Program is closely coordinated with other university programs such as the Educational Opportunity Center, Academic Advisement and Information Center, Admissions, and Financial Aid. The purpose of the Special Services Program is to help students improve their chance of completing their college education.

Testing Service

The tests used for admissions, credit by examination, and placement which are administered through this office include: the American College Testing (ACT), the Miller Analogies Test (MAT), the Graduate Record Examination (GRE), the Medical College Admissions Test (MCAT), the College Level Examination Program (CLEP), the General Education Development (GED) Testing Program, and the UAH chemistry placement test. Applications and information pertaining to the following testing programs are also available: the Graduate Management Admissions Test (GMAT), the National Teachers Examination (NTE), the Law School Admission Test (LSAT), and the Test of English as a Foreign Language (TOEFL).

Placement Tests

All students who are beginning college-level course work in English, mathematics, chemistry, or a foreign language (if taken in high school) are placed at the level best suited to their academic preparation and background.

A student’s ACT scores and high school grades determine his placement in English and mathematics.

A student desiring to register for Chemistry 121 must (1) be placed in CH 121 from results of the Chemistry Placement exam, or (2) have taken CH 101 or its equivalent.

A student who has had formal training in French, German, or Spanish is placed on the level of that language according to the number of units and grades earned in high school or is recommended to take a CLEP subject examination. Because such a student may earn from 3 to 9 hours of academic credit, any student who has had two or more years in a language is urged to take a CLEP examination. Credit earned in this manner will satisfy in-class instruction hours as required by the Modern Language Department (see Modern Language section). If a student elects not to take the CLEP examination, he must begin on the level he has been placed. A student who takes a language other than the one in which he has had formal training will begin on level 101.
A student is required to pursue placement procedures only with regard to the aforementioned academic area and conditions. If a student has not received placement recommendations before enrollment, he should contact the Office of Admissions and Records.

The Chemistry Placement Test and residual ACT Placement tests are scheduled once each term (see the UAH calendar). Students wishing to take these tests should register in the Office of Testing Services at least three days before the tests are to be given. Students will be notified at the time of the exams when they can expect to receive the results of the tests. The charge for the residual ACT is $11. The chemistry placement examination is free.

Credit by Examination

At UAH a student may obtain up to one-fourth of his degree (32 semester hours) by examination. There are three alternatives by which a student may gain credit through examination at UAH: the Advanced Placement (AP) Program, the College Level Examination Program (CLEP), and departmental examinations. Credit by examination is not allowed: (1) to receive credit when a student has successfully completed a course at a higher level than the one being challenged, (2) to raise a passing grade, (3) to remove failures received in a course during the period of current enrollment, or (4) to satisfy the residence requirements for graduation.

Advanced Placement Program

Several UAH departments will award credit to students who have earned a score of 3 or higher on Advanced Placement (AP) Program examinations of the College Entrance Examination Board. The areas in which credit is presently awarded are biological sciences, chemistry, mathematics, English, French, and Spanish. Credit, if awarded, will be recorded without grades or quality points and will not, therefore, be included in calculation of the grade-point average.

College Level Examination Program

The College Level Examination Program (CLEP) is a national program under which a person can receive credit for college level achievement. Anyone who has practical knowledge in an area through independent study, work experience, cultural exposure, and intensive reading, may substantially reduce the cost in both time and money spent on a college degree by taking one or more of these tests. The policy for CLEP credit varies with each institution. The policies listed herein are those of UAH. These tests are given monthly but must be registered for three weeks or longer before the testing date. For a complete listing of dates and deadlines, contact the Office of Testing Services in Morton Hall.

General Examinations

The General Examinations are objective tests that measure achievement in five basic areas of the liberal arts: English composition, humanities, mathematics, natural sciences, and social sciences and history. Credit by General Examination can be given only if examinations were taken before entering college or during first term in college, providing the student has not been enrolled in a comparable course for more than three weeks. The student may be awarded 6 hours elective credit per examination. To achieve credit for any of the general tests, the student must score a minimum of 549. No credit is
awarded for scores below 549. Credit is recorded without grades or quality points and is counted as elective credit only.

**Subject Examinations**

Credit awarded for CLEP subject examinations will be recorded on the student's record without grades or quality points and will not, therefore, be included in calculation of the quality-point average. The CLEP subject tests and minimum score for credit which will be accepted as substitutes for UAH courses are listed below:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Minimum Score</th>
<th>For</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Government (with essay)</td>
<td>54</td>
<td>PSC 101</td>
</tr>
<tr>
<td>American History I (with essay)</td>
<td>53</td>
<td>HY 221</td>
</tr>
<tr>
<td>American History II (with essay)</td>
<td>53</td>
<td>HY 222</td>
</tr>
<tr>
<td>*Analysis and Interpretation of Literature (with essay) and College Composition (composite score)</td>
<td>60</td>
<td>EH 101, 102</td>
</tr>
<tr>
<td>College French, Levels I and II</td>
<td>37</td>
<td>FH 101</td>
</tr>
<tr>
<td>College French, Levels I and II</td>
<td>42</td>
<td>FH 101, 102</td>
</tr>
<tr>
<td>College French, Levels I and II</td>
<td>53</td>
<td>FH 101, 102, 201</td>
</tr>
<tr>
<td>College German, Levels I and II</td>
<td>37</td>
<td>GN 101</td>
</tr>
<tr>
<td>College German, Levels I and II</td>
<td>37</td>
<td>GN 101, 102</td>
</tr>
<tr>
<td>College German, Levels I and II</td>
<td>40</td>
<td>GN 101, 102, 201</td>
</tr>
<tr>
<td>College Spanish, Levels I and II</td>
<td>37</td>
<td>SH 101</td>
</tr>
<tr>
<td>College Spanish, Levels I and II</td>
<td>41</td>
<td>SH 101, 102, 201</td>
</tr>
<tr>
<td>College Spanish, Levels I and II</td>
<td>50</td>
<td>SH 101, 102, 201</td>
</tr>
<tr>
<td>General Chemistry (take placement exam first)</td>
<td>48</td>
<td>CH 121, 123, 125, 126</td>
</tr>
<tr>
<td>Introductory Accounting</td>
<td>57</td>
<td>AC 211, 212</td>
</tr>
<tr>
<td>Introductory Business Law</td>
<td>57</td>
<td>BUS 321</td>
</tr>
<tr>
<td>Introductory Macroeconomics</td>
<td>55</td>
<td>EC 142</td>
</tr>
<tr>
<td>Introductory Microeconomics</td>
<td>55</td>
<td>EC 143</td>
</tr>
<tr>
<td>Introductory Sociology</td>
<td>54</td>
<td>SOC 100</td>
</tr>
</tbody>
</table>
Western Civilization I (with essay) ........................ HY 101 56
Western Civilization II (with essay) ........................ HY 102 56

*The English Department requires a composite score of 60 on the two examinations, Analysis and Interpretation of Literature (with essay) and College Compositions, in order to receive 6 hours credit for English 101, 102. Note that no credit is allowed unless both examinations are taken.

If a student does not pass the test(s) no record is placed on his transcript. General examination or subject examinations may be retaken six months after initial testing.

Credit by subject examination is not allowed unless the appropriate academic department has accepted the CLEP test for use by the university. Some departments offer credit by examination on tests constructed by the department.

UAH Credit by Department Examination

Biological Sciences ........................................ Contact department chairman
Computer science .............................................. All 100 and 200 level courses
Foreign languages ............................................. Contact department chairman
Mathematics .................................................. MA 104, 105, 119, 121, 143, 151, 153, 154, 233
Music ............................................................ MU 101, 102, 103, 110, 201, 202, 311, 312
Nursing .......................................................... Contact Nursing Advisement Office
Philosophy ....................................................... PHL 102, 220
Sociology .......................................................... All courses except 100, 390, and 401 (Contact department chairman)

For further information concerning CLEP or the AP program contact the Office of Testing Services, Room 210, Morton Hall; telephone 895-6725.

Course Information
The courses to be offered each term will be announced in printed timetables well in advance of the term. There is no assurance that a particular course will be scheduled in any given term or year. Instructor assignments listed in the term schedule are subject to change without notice.

Courses are described under the sections of the various schools.

Course Numbering System

<table>
<thead>
<tr>
<th>Range</th>
<th>Year Student Normally Takes Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>001-099</td>
<td>Refresher (noncredit)</td>
</tr>
<tr>
<td>100-199</td>
<td>Freshman</td>
</tr>
<tr>
<td>200-299</td>
<td>Sophomore</td>
</tr>
<tr>
<td>300-399</td>
<td>Junior (upper level)</td>
</tr>
<tr>
<td>400-499</td>
<td>Senior (upper level)</td>
</tr>
<tr>
<td>500-599</td>
<td>Advanced undergraduate credit; graduate credit awarded by permission.</td>
</tr>
<tr>
<td>600-799</td>
<td>Graduate (IPG and advanced undergraduate students only by special permission.)</td>
</tr>
</tbody>
</table>
Student Classification

An undergraduate student is classified as indicated in the following table when he has completed the number of semester hours shown.

<table>
<thead>
<tr>
<th>Classification</th>
<th>Semester Hours Earned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman</td>
<td>0-29</td>
</tr>
<tr>
<td>Sophomore</td>
<td>30-59</td>
</tr>
<tr>
<td>Junior</td>
<td>60-91</td>
</tr>
<tr>
<td>Senior</td>
<td>92 up</td>
</tr>
</tbody>
</table>

Student Course Loads

A full-time undergraduate student is one who is enrolled in courses totaling at least 8 semester hours a term. The maximum number of semester hours in which a student will be permitted to enroll in one term is 13, including simultaneous correspondence courses. Under exceptional circumstances, permission may be granted by the dean of the school in which the student is enrolled to take additional hours. (Equivalents will be used for noncredit and audit courses.) A student enrolling for a minimum load each term should not expect to graduate in four years unless he enrolls four terms each year.

Students are responsible for independent study. Careful budgeting of time is necessary if the desired academic goals are to be reached. Accordingly, full-time students are advised to limit their employment. Experience has shown that approximately twenty hours a week constitutes an average work load that will allow needed time for adequate study.

Students who for financial reasons need to be employed to a greater extent should reduce their course load. To allow sufficient time for the amount and quality of work necessary to meet academic goals, fully-employed undergraduate students normally find that they should take no more than two courses.

A part-time undergraduate student is one who is enrolled in courses totaling one to 7 semester hours.

A full-time graduate student is one who is enrolled in courses totaling 6 to 10 semester hours a term.

Orientation

A new student orientation program is held before the beginning of each term. Students accepted for admission will be invited to attend. At orientation students will be introduced to the services and programs of UAH, see an adviser, select courses, and register for classes.

Registration

Dates of early, regular, and late registration are listed in the UAH calendar. Any continuing or returning student eligible to register may take part in early registration. All past financial obligation to the university must be clear before a student may register for courses.

All students in the School of Engineering and the School of Nursing are required to have an adviser’s approval of registration requests. All students above the level of freshman in the School of Administrative Science are re-
quired to have adviser’s approval of registration. All freshman students and special students are required to process registration requests through the Academic Advisement and Information Center.

A student who schedules courses during any registration period (early, regular, or late) will have made a financial commitment to the university. If courses are dropped or changed, he must submit these changes in writing to the Office of Admissions and Records. Adjustments in fees, if any, will be made by the Bursar’s Office.

Schedule Changes
After a student has completed registration, all changes in his schedule must be made on a change-of-course form and recorded in the Office of Admissions and Records. (See section on Registration for approval required.)

Credit to Audit
A student is permitted to change a course from credit to audit only during the first three weeks of classes.

Removal of Course from Schedule
1. In the case of a canceled class, submission of a change-of-course form by the student helps to correct his record.
2. In the case of a drop before class begins, a change-of-course form must be submitted before the first day of the term.
3. Except in the case of (1) or (2), removal of a course after the first scheduled meeting of a class is considered a withdrawal (see below).

Other Kinds of Changes
The following kinds of changes may be accomplished only during the designated hours of regular and final registration (see UAH calendar).
1. Change from one course to another.
2. Change from one section to another section of the same course.
3. Addition of course to schedule.
4. Change from audit to credit. Only students who are otherwise eligible to take the work for credit will be permitted to make this kind of change.

Withdrawal
A student who wishes to withdraw from one or more courses at UAH must obtain a Request for Withdrawal Form from the Office of Admissions and Records. Regardless of a student’s reason for withdrawal, he must carry out our withdrawal procedures as follows:
1. During the first two weeks of the term, the Request for Withdrawal Form must be signed by the student’s adviser before being submitted to Office of Admissions and Records. A student without a declared major must obtain a signature from an adviser in the Academic advisement and Information Center. A grade of W is recorded.
2. During the third, fourth, fifth, and sixth weeks of the term, Request for Withdrawal Form must be signed by the student’s adviser and his department chairman (or dean) before being submitted to Office of Admissions and Records. A grade of W or WF will be assigned by each instructor, grades assigned will be based on student’s performance to date of withdrawal.
3. Beginning with the seventh week, a student may withdraw for exceptional circumstances only with the approval of the dean. If the dean approves, a grade of W or WF will be assigned by each instructor, with grades assigned based on student’s performance to date of withdrawal.

4. The Request for Withdrawal Form with all appropriate signatures must be returned to the Office of Admissions and Records. Effective date of withdrawal is the date the form is received in Admissions and Records. Notification to instructors will be provided by that office.

Repeating a Course

There is no limit on the number of times a student may repeat a course. Each time a course is taken, the hours attempted and the quality points earned will be counted in calculating the student’s grade point average. The credit for any course repeated may be counted only once toward graduation.

Class Attendance

Education at UAH depends upon the cooperation of students and faculty. Students are held responsible for the full work of the course in which they are registered, including participation in the discussion and work of the class at each class meeting.

A student’s final grade in each course is determined on the basis of identified course requirements; therefore, regular class attendance is important.

Examinations

During each term, one or more announced examinations of class period length may be held.

At the end of each term, a two and one-half hour examination period is scheduled for each course. Absences from a scheduled final examination without previous arrangement with the course instructor (except in extenuating circumstances) will be classified unexcused and a failing grade in the course will be assigned.

Any student whose final examination schedule is such that he is scheduled to take three examinations during a single day shall have the right to have the middle examination rescheduled. The date and time of the rescheduled examination shall be by mutual agreement between the student and the affected faculty member and must be agreed upon by the end of the ninth week of classes. It is the student’s responsibility to notify his instructor of this type of conflict, and it is the instructor’s responsibility to verify that the conflict actually exists. If a student is scheduled to take four examinations during a single day, then the same procedure shall apply except that the student shall now have the right to have both the second and third examinations rescheduled.

Grades

<table>
<thead>
<tr>
<th>Grades</th>
<th>Quality Points per Semester Hour Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-Superior</td>
<td>........................................... 4</td>
</tr>
<tr>
<td>B-Above average</td>
<td>.................................... 3</td>
</tr>
<tr>
<td>C-Average</td>
<td>........................................... 2</td>
</tr>
<tr>
<td>D-Passing</td>
<td>........................................... 1</td>
</tr>
<tr>
<td>F-Failure</td>
<td>........................................... 0</td>
</tr>
</tbody>
</table>
I-Incomplete.
Assigned by the instructor when a student, due to circumstances beyond his control, has not satisfied some requirement of the course. This grade becomes an F unless the course requirements are completed during the first four weeks of the next term of enrollment. If the grade of I is on a student’s record at the time of graduation, it is treated as an F.

X-Excused absence from examination.
Assigned by the instructor when a student completes all course requirements except the final examination. This grade becomes an F unless the examination is completed by the time of the announced deferred examination date at the beginning of the term of next regular enrollment of the student. (See Examinations and UAH calendar.)

W-Withdrawal.
Recorded by the Office of Admissions and Records when a student withdraws from a course with passing work. (See Withdrawal.)

WF-Withdrawal failing.
Recorded by the Office of Admissions and Records when a student withdraws from a course with failing work. (See Withdrawal.)

A grade of S (satisfactory) or U (unsatisfactory) is assigned in all noncredit courses and in some specified credit courses.
A grade of P (passing) or F (failing) is assigned in some courses. (See Pass-Fail System.)

Change of Grade
Grades submitted to the Office of Admissions and Records can be changed only by submission by the instructor of a Change of Grade form containing a written explanation of the error. The Change of Grade form must be approved by the dean of the school concerned.

Student Grade Report
At the completion of each term, a report of final grades is mailed to the address furnished by the student.
A statement of a student’s satisfactory or unsatisfactory academic performance will be provided, upon request, to the individual or agency sponsoring the student’s tuition if the individual or agency submits a statement certifying grade release unless written notification to the contrary is submitted by the student to the Office of Admissions and Records before the final examination period.

Grade-Point Average
The grade-point average (GPA) is computed by dividing the total number of quality points earned by the total number of semester hours attempted. Courses in which a grade of W, P, or S is assigned are not included.

Honors
Honor Scholar
An undergraduate student earning 8 or more semester hours in a term with a GPA of 3.50-4.00 is distinguished by being identified as an honor scholar.
A student who takes less than 8 semester hours a term and establishes a GPA of 3.50-4.00 at the end of the term in which a cumulative total of at least 8 semester hours are completed will be designated as an honor scholar. For this purpose, a part-time student's work will be considered in blocks that do not overlap.

Scholar
An undergraduate student earning 8 or more semester hours in a term with a GPA of 3.00-3.49 is recognized by having his name placed on the list of scholars.

A student who takes less than 8 semester hours a term and establishes a GPA of 3.00-3.49 at the end of the term in which a cumulative total of at least 8 semester hours are completed, will have his name placed on the list of scholars. For this purpose, a part-time student's work will be considered in blocks that do not overlap.

Honors at Graduation
A student graduating at the bachelor’s level with a GPA of 3.20 up to 3.50 will be graduated with honor; a student with a GPA of 3.50 up to 3.80 will be graduated with high honor; a student with a GPA of 3.80-or higher will be graduated with highest honor.

In determining eligibility for honors, a student’s overall GPA as well as his GPA on work taken at UAH will be computed and both computations must fall within the specified range.

Honor designations will appear on transcripts, commencement programs and diplomas.

Academic Probation and Suspension
In order to remain in good academic standing, an undergraduate student must maintain an average of 2.0 (C) on all work attempted at UAH as well as on all college work attempted.

At any point that a student’s cumulative grade point average, either overall or at UAH, falls below 2.0 (C), the student will be placed on scholastic probation. (See exception applied to freshmen below.)

If a student’s grade point average on one term (minimum load 8 hours, accumulated for part-time students) is below 1.0 (D) with the cumulative GPA greater than 2.0, a warning message will be printed on the student's grade report, and a list of such students provided to the school deans.

A beginning freshman will be reviewed for the first time at the end of the term in which he has attempted a total of 8 semester hours of work (accumulated for part-time). At this point, if the student has at least a 1.0 but less than 2.0, he is placed on academic warning and referred for appropriate advising. If such a student has a GPA of less than 1.0, he is placed on scholastic probation.

Once a student is placed on scholastic probation, such a student is reviewed in intervals of a minimum of 8 semester hours of work attempted (accumulated for part-time students). At such review points, three actions are possible:

1. If cumulative GPA is 2.0 on all work and on UAH work, student is removed from probation.
2. If cumulative GPA is less than 2.0 on all work, but block of work being reviewed is 2.0 or higher, student is continued on probation.

3. If cumulative GPA is less than 2.0 on all work or on UAH work and GPA on block of work being reviewed is less than 2.0, student is suspended.

A regularly admitted student suspended for the first time is automatically eligible to re-enter the second term following such suspension. A student admitted in any special category and suspended for the first time must petition the Admissions Committee for permission to re-enter.

A student suspended the second time within the University of Alabama System is disqualified for readmission. After a period of one year, such student may petition for readmission.

A student whose academic status is indeterminate because of grades I or X may be permitted to register conditionally. A student with either of these grades should take the necessary steps to remove the incomplete grades within the specified time limits. (See Grades.) At the time such grades are changed to regular letter grades, the appropriate scholastic review will be made and necessary action taken.

Individual schools may have additional requirements specific to their programs. Refer to school sections.

Academic Appeal Process

Academic appeals will originate with the student and will be processed through the student's major department, the dean of the school, and the Office of Academic Affairs, in that order. Students classified as "special" will be routed through the most appropriate academic dean.

Change of School

Students who are pursuing a program of study in one school or division at UAH and desire to change to a program in another school or division may petition to do so by making application at the Office of Admissions and Records. Academic advisement before changing programs may help students avoid losing credits. Application of previously earned credits toward the new program will be determined after the transfer has been approved.

Declaring a Major

Students will declare a major by the end of the freshman year. When the student declares a major, the student will be assigned an adviser by the relevant dean/department chairman. At that time the complete advising folder will be transferred from the Academic Advisement and Information Center to the relevant dean or department chairman's office for permanent retention. Sophomores who have not declared a major will continue to have their registration cards signed in the Academic Advisement and Information Center (AAIC). If students with 45 semester hours are still not prepared to declare their majors, they will declare an intention to continue to seek advice from the AAIC.

Within the same degree a student may elect to complete requirements for more than one major.
Pass-Fail System

To be eligible to take courses on a P-F basis, a student must: (1) have junior or senior standing; (2) not be on probation; (3) have an approved major or program plan appropriately filed. A student is limited to 12 semester hours of credit on a P-F basis. P-F system applies only to courses chosen as electives. Some departments limit P-F option to electives outside the department or school.

A grade of P may be changed to a regular grade only if the student changes his program to an area in which a regular grade is required. The change must be initiated at the dean's office and must go through the normal grade change procedures. Once a P grade has been changed to a regular grade, it must remain.

Under the P-F system, a grade of P will not be counted in a student's GPA; a grade of F will be counted in a student's GPA.

A student wishing to exercise a P-F option must make application at the Office of Admissions and Records before the end of the late registration period.

Visiting Student Program

Undergraduate

A cooperative arrangement exists with Alabama A&M University, Athens State College, Calhoun Community College, Oakwood College and the University of Alabama in Huntsville. Under this arrangement, a student at any of the participating institutions may request permission to attend a course at one of the other schools. Conditions governing the granting of permission include the following:

1. The student must be a full-time student or a full-time university employee who is a part-time student.
2. The course desired must be unavailable at the student's home institution.
3. Visiting students are limited to one undergraduate course a term at the host institution except where the second course is a laboratory required to accompany the first course or the second course is a one hour course in basic military science.
4. The student must have an overall C average.
5. The student's request must be approved by his adviser and other appropriate personnel.
6. Permission of the host institution is dependent upon availability of space for the visitor after its own students are accommodated.

Any student interested in participating in the Visiting Student Program should contact the Office of Admissions and Records for information regarding the procedures to be followed.

Graduate

A cooperative arrangement exists with Alabama A&M University. Any student interested in participating in this program should consult the School of Graduate Studies section of this catalog.
Reserve Officers Training Corps (ROTC)

Through the visiting student program, students at the University of Alabama in Huntsville may enroll in the ROTC Program in the Department of Military Science at Alabama A&M University. A prescribed course of study under the program prepares graduates for positions of officer leadership within the national defense structure. Depending upon qualifications students may enroll either in a basic or advanced course of study in the ROTC Program. Specific requirements and a description of the courses of study are provided in the current Alabama A&M bulletin. Students interested in participating in this program should contact the Office of the Professor of Military Science at Alabama A&M University and the Office of Admissions and Records at the University of Alabama in Huntsville.

Application for Graduation

Candidates for graduation must file their application at least six months prior to the time requirements are expected to be completed. Application forms may be obtained at the Office of Admissions and Records. Early application will assist the student by confirming requirements remaining to be completed.

Students completing degree requirements in any term other than spring and fall terms will be given certified letters of completion and will receive diplomas at the next graduation ceremony.

Second Bachelor's Degree

A student who holds a bachelor’s (or higher) degree from another institution and who wishes to earn a second bachelor’s degree at UAH, must request a detailed evaluation of his previous record before he may officially declare a major. The program for the second bachelor’s degree must meet all requirements imposed on transfer students (e.g., hours in residence, upper level hours, appropriate major and minor or cognate studies).

After a student has earned one bachelor’s degree at UAH, he may qualify for a second bachelor’s degree by completing (in addition to credits earned while pursuing the first degree) in residence a minimum of 25 percent of the total degree requirements for the second degree. The second degree must include a new major. The student must meet all other applicable requirements for the degree. Excess credits earned while pursuing the first degree are not applicable to the second degree.

Time Limits

A student may complete requirements for graduation as specified in the UAH catalog for the year he enters UAH provided he does so within a period of seven years from his original date of entry. If a student does not complete requirements for graduation within the prescribed time, he must change to the current catalog and meet the requirements as specified. At any time within the seven years that requirements for graduation are changed, a student may elect to be graduated under the new requirements.
Transcripts

Official transcripts are issued and sent by the Office of Admissions and Records to recognized institutions and agencies which require such documents. Transcripts are issued only upon the written request of the student involved.

Official transcripts are not issued to the individual student; however, he may request an unofficial transcript which does not bear the university seal.

The first copy of a transcript is free; a charge of $2 is made for each additional transcript issued. No charge is made for transcripts issued to other units of the University of Alabama System.

No transcript will be issued for a person who has a financial obligation to the university.

Correspondence Study and Other Nonresident Credit.

Persons interested in taking correspondence study courses through the University of Alabama in Tuscaloosa may write to the Independent Study Division, the University of Alabama, P.O. Box 2967, University, Alabama 35486.

Up to 25 percent of the credit applied toward a baccalaureate degree may be earned by means other than residence credit at an approved institution. Examples of other means are credit by examination, correspondence study, educational experiences in the armed forces, and professional certificate programs.

Undergraduate Schools, Majors and Degrees

Detailed information concerning the various degree programs, including course descriptions, is organized according to schools. See the table of contents for the listing of schools.

The undergraduate academic programs of the University of Alabama in Huntsville are administered by five schools with the following approved major programs:

School of Administrative Science

Areas of study in which majors are currently offered are:
- Accounting
- Economics
- Finance
- Management

Management Information Systems
- Marketing
- Procurement Management

Courses are also offered in logistics management and management science.

School of Arts, Humanities and Social Sciences

Areas of study in which majors are currently offered are the following:
- Art
- Criminal justice
- Education
- English
- Foreign Language/International Trade
- French
- German
- History
- Human Growth and Development
- Music
- Music education
- Political science
- Psychology
- Slavic studies
- Sociology

Other areas with course offerings are American studies, communications, linguistics, philosophy, Russian, Spanish and physical education.
School of Engineering
Areas of study in which majors are currently offered are:
Chemical engineering  Industrial and systems engineering
Civil engineering  Mechanical engineering
Electrical and computer engineering

School of Mathematical and Natural Sciences
Areas of study in which majors are currently offered are:
Biological sciences  Mathematics
Chemistry  Mathematics education
Computer science  Physics
Courses are also offered in environmental science, natural science and statistics.

School of Nursing
All majors receive instruction in the theory of nursing as well as laboratory practice in a variety of clinical settings to prepare them for beginning-level practice in professional nursing. Students may select a cognate area in either behavioral science or natural science. Graduates of this first professional degree are qualified for admission to graduate study in an area of specialization.

Degrees Offered
Programs are provided as indicated below for the undergraduate degrees of Bachelor of Arts, Bachelor of Science, Bachelor of Science in Business Administration, Bachelor of Science in Engineering, and Bachelor of Science in Nursing.

Bachelor of Arts—Art, biological sciences, criminal justice, economics, education, English, foreign language/international trade, French, German, history, human growth and development, mathematics, mathematics education, music, music education, political science, psychology, Slavic studies, sociology
Bachelor of Science—Biological sciences, chemistry, computer science, education, mathematics, mathematics education, physics
Bachelor of Science in Business Administration—Accounting, economics, finance, management, management information systems, marketing, procurement management.
Bachelor of Science in Engineering—Unified programs with professional specializations
Bachelor of Science in Nursing—Unified professional curriculum with cognate option.

Total Degree Requirements
1. Minimum requirements for the Bachelor of Arts, Bachelor of Science, Bachelor of Science in Business Administration, and Bachelor of Science in Nursing degrees are 128 semester hours; for the Bachelor of Science in Electrical and Industrial and Systems Engineering degree, 129 semester hours; for the Bachelor of Science in Chemical, Civil and Mechanical Engineering degree, 133 semester hours; and for the Bachelor of Arts in Music, 134 semester hours. A minimum of 25 percent of the total requirements and 12 of the last 18 hours must be completed at UAH. Also, unless otherwise specified
by the department involved, a minimum of 12 semester hours of upper-level numbered 300 or above must be completed at UAH in a student’s AOC (6 hours in his major and 6 hours in his minor or cognate studies). A minimum of 30 percent of the total degree requirements must be taken in courses numbered 300 or above.

2. The maximum amount of correspondence or credit by examination allowed towards a bachelor’s degree is 25 percent of the degree requirements.

3. An overall average of C is required for all courses taken: (a) at all institutions; (b) at UAH; (c) in all courses in the major discipline taken at UAH, and also in all courses taken in the major discipline, including UAH courses and transfer courses; and (d) in all courses in the minor discipline taken at UAH, and in all courses taken in the minor discipline including UAH courses and transfer courses; or in all courses listed in the cognate studies option taken at UAH, and in all courses listed in the cognate studies option, including UAH courses and transfer courses.

4. Additional degree requirements for each degree are described in the appropriate sections of this catalog.

Requirements for Programs Leading to B.A. and B.S. Degrees

I. General Education Phase
The general education phase provides the foundation for liberal learning and includes writing, literature, history, social science, natural sciences, mathematics, and foreign language. Specific requirements for general education have been identified for each degree. Courses which are included both in general education requirements and also in either the major or minor may be omitted in calculating the maximum of 64 hours which may be required in the AOC.

General Education Requirements for the Bachelor of Arts Degree

Humanities and Social Sciences

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>English composition</td>
<td>6</td>
</tr>
<tr>
<td>Survey of literature (EH 205-206; 205-241; 205-230; 240-206; 240-230)</td>
<td></td>
</tr>
<tr>
<td>Origins and Development of the Contemporary World (HY 101-102)</td>
<td>6</td>
</tr>
<tr>
<td>Economics, political science, philosophy, psychology, or sociology</td>
<td>6</td>
</tr>
<tr>
<td>(one discipline)</td>
<td></td>
</tr>
<tr>
<td>[If major is political science or psychology, the social sciences requirement should be taken in one of the other disciplines.]</td>
<td></td>
</tr>
<tr>
<td>Foreign language</td>
<td>6-12</td>
</tr>
</tbody>
</table>

(See section entitled Foreign Languages and Literatures.)

Science-Mathematics

(Laboratory sciences consist of courses in biological sciences, chemistry, natural science, and physics. Normally a combination of natural science and other science courses is not allowed.)

A student may select any of the following options: (For teacher certification, both biological and physical sciences must be included. See Education
Department section for certification requirements.

a. Mathematics, 6 hours; one laboratory science, 8 hours
b. Two laboratory sciences, 8 hours each
c. Mathematics, 3 hours; one laboratory science, 8 hours; another laboratory science, 4 hours
d. Mathematics, 3 hours; natural science sequence (NS 111,112,113) 12 hours

General Education Requirements for the Bachelor of Science Degree

**Humanities and Social Sciences**

- English composition .................................................. 6
- Survey of literature (EH 205-206; 205-241; 205-230; 240-206; 240-230) .................................................. 6
- Origins and Development of the Contemporary World (HY 101-102) .................................................. 6
- Economics, political science, philosophy, psychology, or sociology (one discipline) ................. 6
- Foreign language .................................................. 6-12
  (See section entitled Foreign Languages and Literatures.)

**Science-Mathematics**

Two sciences selected from biological sciences, chemistry, physics, 8 hours in each .................................................. 16
Mathematics .................................................. 9

II. The Area of Concentration (AOC)

The Area of Concentration (AOC) is that part of the student's undergraduate degree program comprised of the major and minor or major and cognate studies. The upper limit which the university may require in the AOC is 64 hours, with the exception of music and nursing. A student may elect to include additional hours. Courses which are included in both general education requirements and the AOC may be omitted in calculating the 64 hour maximum. No course may be counted more than once in calculating total credits for the major, the minor or cognate studies.

A major is an accumulation of courses designed to give the student depth of competence and understanding of a subject. Its development may be visualized as vertical. Suggested minimum number of hours to constitute a major: 36 (including 15 upper level, with a minimum of 6 upper level at UAH.) Students will not be permitted to transfer courses from the major to electives once the course has been taken. Minimum academic standard required for graduation: (a) C average in all courses in the major discipline taken at UAH; (b) C average in all courses taken in the major discipline, including UAH courses and transfer courses.

A composite major may be developed from courses in more than one discipline. Guidelines for such majors should be identified by the department involved and approved by the Vice President for Academic Affairs. Explicit course programs are subject to approval by all disciplines concerned and must meet minimum standards as set forth above.
Within the same degree a student may elect to complete requirements for more than one major. Such an AOC must receive the approval of each department in which a major is declared.

In support of a major, a student may choose one of two options:

a. A minor is composed of a minimum of 21 semester hours (6 upper level, with a minimum of 6 upper level at UAH) in a single department or program in which the minor is taken. A minimum of 6 hours (usually two courses) must remain to be taken at the time the minor is approved. Its development can be visualized as vertical similar to that of the major, but at less depth. Individual departments or programs establish guidelines for minors from that department or program and any student wishing to exercise this option must have the approval of the chairman of the department or program in which he takes his minor. Students will not be permitted to transfer courses from the minor to electives once the course has been taken. Minimum academic standard required for graduation: (1) C average in all courses in minor discipline taken at UAH; (2) C average in all courses taken in the minor discipline, including UAH courses and transfer courses.

b. Cognate studies is defined as a group of courses in two or more disciplines designed to give the student breadth, relating his major subject to other fields of knowledge. Its development may be visualized as horizontal, and its composition should be based upon (1) interdisciplinary development of one aspect of the major, (2) specifically identified career goals, or (3) a logically defensible relationship for an identified purpose. The minimum number of hours in the cognate studies is 21 (including 9 upper level, with a minimum of 6 upper level at UAH). The selection of courses included in the cognate studies must be approved by the student's major adviser. Students will not be permitted to transfer courses from those listed for cognate studies to electives once the course has been taken. Minimum academic standard required for graduation: (1) C average in all courses listed in the cognate studies option taken at UAH; (2) C average in all courses listed in the cognate studies option, including UAH courses and transfer courses.

At the time the degree is awarded the student's major(s) will be identified on the transcript. If the program includes a minor, the minor discipline will also be shown; if the cognate studies option is chosen "Cognate Studies" will be shown with no disciplines identified.

The AOC Form is a document prepared cooperatively by a student and a responsible faculty adviser, with the prior assistance of the Office of Admissions and Records in preparing the evaluation of transfer credits and reviewing general education requirements. Academic departments or schools must assume responsibility for ensuring that each of their students has an opportunity to develop an AOC form before the end of the student's sophomore year. Once the AOC form has been accurately completed, checked in the dean's office, and signed by the appropriate individuals, it becomes a contract between the student and the university with responsibilities bearing on both parties.

III. Electives

Electives are courses taken by the student beyond the requirements identified in I and II above. A minimum of 12 hours of electives must be chosen from disciplines not included in the AOC.
Requirements for Programs Leading to B.S.B.A., B.S.E., and B.S.N. Degrees

Requirements for professional programs offered are described in the appropriate sections of this catalog. These programs include the Bachelor of Science in Business Administration, the Bachelor of Science in Engineering, and the Bachelor of Science in Nursing.

Professional Preparatory Programs

Prelaw Program

To be admitted to an accredited law school, the student must have a bachelor’s degree, an acceptable score on the Law School Admissions Test (LSAT), and, in most cases, an accumulative grade-point average of B or better. The LSAT should be taken in June or October of the year before the student plans to enter law school. Applications to law school, together with test scores, transcripts, and recommendations, should be submitted to law schools no later than January 1 of the year the student plans to begin law school. For specific admission requirements, the student should consult the catalog of the law school he wishes to attend.

In pursuing a prelaw program at the University of Alabama in Huntsville, the student will find that the best preparation during the first two years is through the completion of the general education requirements. The Statement on Prelegal Education of the Association of American Law Schools notes that “What law schools seek in their entering students is not accomplishment in mere memorization but accomplishment in understanding, the capacity to think for themselves, and the ability to express their thoughts with clarity and force.” The prelaw student therefore must develop perception and skill in the English language, insight into the institutions and values with which people are concerned, and the power to think clearly, carefully, and independently. Since these skills are fostered by the general education requirements, completion of them should be the primary concern of the beginning prelaw student.

No law school recommends a particular major or minor as preparation for admission. Students should therefore design their Area of Concentration with the aim of further development and promotion of the skills listed above. Care should be taken in choosing electives. Aside from the courses in the general education requirements, the prelaw program should include courses in political science, economics, philosophy (especially logic), American History, statistics, and computer science. One course in accounting is recommended. Since admission to law school is highly competitive, completion of recommended programs and requirements will not necessarily insure admission.

All prelaw students should seek academic counseling from prelaw advisers in the Departments of English and Communication Arts, History, and Political Science. Materials and information are available in these departments or in the Academic Advisement and Information Center. The official Prelaw Handbook may be consulted in these offices or ordered from the Law School Admissions Services, Box 2000, Newtown, PA 18940.

Premedical and Predental Programs

Most students entering medical or dental schools do so after earning an undergraduate degree. After consulting the specific requirements of the
desired medical or dental school, applicants interested in careers in medicine or dentistry will find that UAH offers programs that will prepare them for admission to the professional school.

Competition for admission to medical and dental schools is intense and students should realize that completion of the admission requirements does not insure acceptance. Since admission to the schools is not assumed, students are advised to complete undergraduate degree requirements.

Typical of the requirements for admission to medical colleges are those which follow for the University of Alabama School of Medicine:

1. Two academic years of English
2. One and one-half academic years of general biology or zoology plus electives
3. One academic year of general inorganic chemistry (including qualitative analysis and laboratory work)
4. One academic year of organic chemistry with laboratory work
5. One academic year of physics with laboratory
6. College algebra and trigonometry

In addition many medical schools require that students take one year of physical chemistry and mathematics through calculus. Students are encouraged to take as much chemistry and mathematics as possible. To reduce duplication in later work, genetics, cellular and developmental biology, and cellular physiology are recommended as electives in life sciences. A student is advised to choose his program according to his individual interest and ability so that he may fulfill his maximum academic potential.

The UAH School of Primary Medical Care offers for selected UAH undergraduates several courses that are designed to assist pre-health professional students to increase their awareness of the health professions, problems, and issues. These courses are described in this catalog's School of Primary Medical Care section, which also includes descriptions of the school's medical student and resident programs.

Typical of the requirements for admission to dental schools are these which follow for the School of Dentistry of the University of Alabama in Birmingham:

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Biological sciences .............................................. 8</td>
</tr>
<tr>
<td>2. Inorganic chemistry (including qualitative analysis) .............. 8</td>
</tr>
<tr>
<td>3. Organic chemistry .............................................. 8</td>
</tr>
<tr>
<td>4. Quantitative analysis ............................................ 4</td>
</tr>
<tr>
<td>5. Physics (including laboratory) .................................... 8</td>
</tr>
<tr>
<td>6. College algebra and trigonometry ................................ 6</td>
</tr>
<tr>
<td>7. 30 semester hours of nonscience courses to include 6 (preferably 12) semester hours in English. It is recommended that students complete 12 semester hours in a foreign language and include as many courses in history, political science, economics, philosophy, psychology, and sociology as possible ........................................... 30</td>
</tr>
<tr>
<td>8. The completion of a minimum of 90 semester hours of collegiate work.</td>
</tr>
</tbody>
</table>
Students should elect courses in mathematics through calculus and should not elect biological sciences courses that constitute a part of the dental school curriculum. Students interested in preprofessional health programs (dentistry, premedicine, preoptometry, preveterinarian medicine) are encouraged to contact the preprofessional adviser by calling the Office of the Dean, School of Mathematical and Natural Sciences.

Medical Technology
A bachelor’s degree program with emphasis in premedical technology is available through the Biological Sciences Department (Curriculum VIII). This curriculum is designed to satisfy prerequisite requirements for acceptance into a clinical training program in medical technology.

Education—Teaching Certificates
A student may complete professional requirements for a Class B Elementary, Middle or High School Professional Teaching Certificate in any of the approved major areas of concentration, a Class B Elementary-Secondary Professional Certificate in Art and Music, and a Class A Special Education Professional Certificate with an endorsement in learning disabilities, early childhood education for the handicapped, and school psychometry. Class A Professional Certificates are also available in biological sciences, chemistry, English, history, mathematics, and physics. Students interested in a degree in education involving programs in other major area may complete much of the course work at UAH. When preparing such programs, a student should consult the requirements of the particular school to which he may transfer.

Environmental Science Certificate Program
A student may elect to follow a program of environmental science courses leading to a Certificate in Environmental Science. A fully prepared student can earn the certificate while completing the requirements for the bachelor’s degree in mathematics, science, or engineering without any additional hours. The program includes basic science courses, most of which would normally be included in the curriculum; a core of four courses in ecology, climatology and meteorology, geology, and hydrology, and pollution problems; and any two of several advanced environmental science and engineering courses. In completing the program, the student also satisfies the requirements for an undergraduate minor in environmental science.
School of Administrative Science

Dean C. David Billings, B.S., Ph.D., Professor of Finance

Accounting and Business Legal Studies

Professor Lasseigne; Associate Professor Bryson (coordinator); Assistant Professor Elmore; Adjunct Assistant Professors Billions, Petty, Swann; Instructors Donaldson, Haynes, Ostermann, Price, Whitten

Economics and Finance

Professors Billings, Bond (coordinator); Associate Professor Paul; Assistant Professors Schoening, Schroeder, Scriven, Spence; Instructor Gord

Management and Marketing

University Professor Graves; Associate Professor Olsen; Visiting Associate Professor Marcus; Adjunct Associate Professor B. Davis; Assistant Professors T. Davis, Griffin (coordinator), Rees, Sherman; Instructors Asherbranner, Jones, Krishnasami, Rumford.

Objectives

The School of Administrative Science is a professional school which seeks to accomplish three major objectives in serving the educational, research and service needs of regional public and private organizations; those objectives are:

1. to provide quality programs of undergraduate and graduate instruction in educating persons for the practice of administration at all levels of responsibility in diverse organizations;

2. to conduct productive applied research which furthers the accumulated knowledge of the operation of complex organizations and serves the needs of the local and regional business and public organizations;
3. to render public service to business, industry and government in the region.

These objectives are pursued in an environment increasingly oriented toward the application of advanced technology in the administration and operation of organizations. A basic premise of the School’s mission is that the increasing influence and importance of complex organizations in today’s society require the development of competent and creative administrators.

To prepare students for the challenges of the future, the School’s programs provide a solid foundation in the diverse academic disciplines which relate to the needs of business, industry, and government. At the undergraduate level this requires students to concentrate the first two years of study in a liberal education of the humanities and fine arts, the behavioral and social sciences, the natural sciences, and mathematics. Successful completion of courses in these areas, as well as a pre-business administration core curriculum, prepares the student for admission to upper-division course work in the School of Administrative Science.

The major portion of the remaining two years of course work develops the student’s understanding of the diverse functions of business in the American and world-wide economy by focusing on the essential concepts of business and administration. On top of this foundation, the student builds a field of specialization (major option). The fields of specialization include accounting, economics, finance, management, management information systems, marketing, and procurement management.

At the graduate level, students may pursue a Master of Administrative Science degree regardless of the field of study provided by their baccalaureate degrees. The program provides a common foundation in the essential elements of management for students with no prior academic work in administrative science. Then emphasis is given to an in-depth study of management as it applies to a wide variety of organizational settings. This is accomplished through the completion of core courses and an area of specialization.

Memberships

The School of Administrative Science is a member of the American Assembly of Collegiate Schools of Business (AACSB) which is a not-for-profit corporation of educational institutions, corporations, and other organizations devoted to the promotion and improvement of higher education in business administration and management.

The School is an associate member of the Association for University Business and Economic Research which is the professional association of business and economic research organizations in universities in America and six other countries.

The School is a member of the National Association of Management and Technical Assistance Centers which is a non-profit association of management and technical assistance centers devoted to marshalling the resources of institutions of higher education to accelerate the economic development process.
Center for High Technology Management and Economic Research

The Center for High Technology Management and Economic Research is the applied research arm of the School which provides management and technical assistance to a wide range of public and private organizations. The Center identifies resources and focuses them on economic and administrative matters of local and regional concern. Such activities assist external organizations and also enrich the education of students in the School.

The Small Business Development Center

The Small Business Development Center aids in the fulfillment of the School's mission by providing managerial and technical assistance to entrepreneurial ventures for small businesses. The Small Business Development Center assists entrepreneurs, advises potential entrepreneurs, assists in developing jobs in the private sector, and advocates the free enterprise system.

Executive Education Program

The Executive Education Program is designed to assist the members of the business, industry and governmental communities in keeping abreast of changes in a complex environment. The School of Administrative Science in cooperation with the Division of Continuing Education’s Office of Management Studies offers an interactive blend of management educational programming ranging from one-session seminars on specific problems to a substantial sequence of classes custom tailored for corporate and governmental audiences.

Degrees Offered

The School of Administrative Science offers two undergraduate degrees, the Bachelor of Science in Business Administration (BSBA) and the Bachelor of Arts (BA) in economics. The BSBA encompasses specializations in accounting, economics, finance, management, management information systems, marketing, and procurement management.

The School’s Graduate Program in Administrative Science offers a Master of Administrative Science (MAS) for qualified students desiring advanced work in management. This program encompasses specializations in computer science, economics, educational administration, human resource management, industrial and systems engineering, operations research, project management, and public administration.

Highly qualified students enrolled in the BSBA undergraduate program of the School of Administrative Science may be able to complete the requirements for a master’s degree by completing one additional year of course work beyond the bachelor’s level. BSBA seniors who are interested in obtaining an MAS degree should contact the School’s Programs Coordinator in Room 332 Morton Hall.

Student Advisement and Enrollment

Faculty advising of students is an integral part of the student’s academic progress and career development. Advising for BSBA and BA degree candidates is handled through the University’s Academic Advisement and Infor-
mation Center (AAIC), the School’s Programs Office, and faculty members in
the student’s intended area of specialization.

First year students and newly enrolled transfer students are required to plan
their course selection with an adviser in the AAIC. After completing the first
year of studies (30 semester hours), or a transfer student’s first term, students
must elect to either continue to be advised through the AAIC or declare a ma­
jor and be advised through the appropriate school. In the School of Admin­
nistrative Science, undergraduate academic advisement is provided in the
School’s Programs Office by the Coordinator of Undergraduate Advisement.
After declaring a major, the student will be referred for advisement by the
Coordinator of Undergraduate Advisement to a faculty member in the stu­
dent’s area of specialization.

The School’s Programs Coordinator, in conjunction with members of the
School’s graduate faculty, is responsible for advising all Administrative
Science graduate students.

All School of Administrative Science students, graduate and undergraduate,
must have class registration cards approved by one of the advisement person­
nel mentioned previously. Registration cards and drop/add slips will not be
processed without the appropriate approval. Each student is responsible for
registering for all required courses in their proper sequence and for fulfilling
all requirements for admission and graduation.

Transfer Students

In addition to complying with the university policy for the admission of
transfer students (see the Admissions Information section) a prospective
transfer student seeking a BSBA or BA degree should seek advice from the
School’s Coordinator of Undergraduate Advisement at least one month before
registering. Students whose transcripts are received in time for evaluation by
the Office of Admissions and Records before the beginning of the term will
receive a copy indicating the accepted transfer credits.

The specific credit for work done at other institutions which will apply
toward the BSBA or BA degree is determined by the Dean of the School of Ad­
niministrative Science. Allowance of transfer credit by the Office of Admissions
and Records does not necessarily mean that such credit will be applied toward
a BSBA or BA degree. All inquiries concerning the applicability of credit
should be made to the School’s Programs Office.

Credit for business administration courses taken in schools with American
Assembly of Collegiate Schools of Business (AACSB) accredited programs is
transferable to UAH. Credit in courses taken in programs without AACSB ac­
creditation may be accepted with approval of the Dean.

Transfer credit for courses equivalent to those taught in the School of Ad­
niministrative Science and English composition courses may only be accepted
with a grade of a least a ‘‘C’’. All other transfer credit is granted in accordance
with University regulations. (See Evaluation of Transfer Credits section).

Course work taken at a junior college after a student has earned more than
64 semester hours of credit may not be accepted for transfer. Courses taken at
the lower division at another institution which are upper division courses at
UAH will be accepted for transfer only after successful completion of an up­
per level class in the same area with a grade of ‘‘C’’ or better or by passing a
validation examination.
Residency Requirement

At least 12 of the last 18 semester hours of a student’s program and a minimum of 32 semester hours of the total degree program must be completed at UAH. For BSBA students, the hours taken in residency must include at least 50 percent of the BSBA program (core curriculum and major option) including a minimum of 12 hours in the major option and 3 hours in MGT 420 Business Policy. Students who are required to take additional courses within the School of Administrative Science in order to meet the residency requirement may be required to complete more than 128 semester hours in order to graduate.

Bachelor of Science in Business Administration
Degree Requirements

The Bachelor of Science in Business Administration degree program is a comprehensive four year program which includes a liberal arts and science foundation, a pre-business administration core curriculum, a junior-senior business administration core curriculum, an area of specialization (major option), and a choice of elective courses. Each student must meet the following degree requirements established by the University and the faculty of the School of Administrative Science to be awarded a BSBA:

1. Complete a minimum of 128 semester hours of work with a minimum of 39 semester hours in courses numbered 300 and above;
2. Attain a minimum grade point average of 2.0 (C) in all course work attempted;
3. Attain a minimum grade point average of 2.0 (C) in the Business Administration Core Curriculum (39 hours).
4. Attain a minimum grade point average of 2.0 (C) in the major option.
5. Complete the business policy course with a minimum grade of "C";
6. Comply with University and School of Administrative Science residency requirements.

Lower Division Requirements: 61-66 Semester Hours

Work in the first two years of study is planned in such a way as to give the student basic information in the general areas of (1) the humanities and fine arts, (2) communication, (3) the social and behavioral sciences, (4) the natural and physical sciences, and (5) mathematics. This liberal arts and science foundation is referred to as the General Education Requirements (GER). In addition to the GER, students must complete 18 semester hours of work in the pre-business administration core curriculum. Specific courses in the GER and the pre-business administration core curriculum are as follows:
I. General Education Requirements

<table>
<thead>
<tr>
<th>Category</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Humanities and Fine Arts</td>
<td></td>
</tr>
<tr>
<td>a. English Composition EH 101-102 or 103-104</td>
<td>6</td>
</tr>
<tr>
<td>b. Library Research BIB 230</td>
<td>1</td>
</tr>
<tr>
<td>c. Twelve hours selected from history, literature, art, communication (not CM 113), foreign language, philosophy or music. Six hours must be taken in either history or literature. A maximum of 6 hours may be taken in any one field.</td>
<td>12</td>
</tr>
<tr>
<td>2. Communication</td>
<td>3</td>
</tr>
<tr>
<td>Basic Speech Communication CM 113</td>
<td></td>
</tr>
<tr>
<td>3. Social and Behavioral Sciences</td>
<td>12</td>
</tr>
<tr>
<td>Twelve hours selected from the following fields with a maximum of 6 hours in one discipline: political science, psychology, or sociology</td>
<td></td>
</tr>
<tr>
<td>4. Natural and Physical Sciences</td>
<td>6-8</td>
</tr>
<tr>
<td>Six to eight hours from the following fields: biological sciences, chemistry, natural science, or physics</td>
<td></td>
</tr>
<tr>
<td>5. Mathematics*</td>
<td></td>
</tr>
<tr>
<td>MA 143 Finite Mathematics</td>
<td></td>
</tr>
<tr>
<td>or</td>
<td></td>
</tr>
<tr>
<td>MA 121 Precalculus II</td>
<td>3</td>
</tr>
<tr>
<td>MA 151 Survey of Elementary Calculus</td>
<td>3</td>
</tr>
<tr>
<td>or</td>
<td></td>
</tr>
<tr>
<td>Level III placement and</td>
<td></td>
</tr>
<tr>
<td>MA 151 Survey of Elementary Calculus</td>
<td>3</td>
</tr>
<tr>
<td>or</td>
<td></td>
</tr>
<tr>
<td>MA 153 Calculus and Analytical Geometry</td>
<td>3</td>
</tr>
<tr>
<td>or</td>
<td></td>
</tr>
<tr>
<td>MA 121 Precalculus II</td>
<td>3</td>
</tr>
<tr>
<td>MA 153 Calculus and Analytical Geometry</td>
<td>3</td>
</tr>
<tr>
<td>or</td>
<td></td>
</tr>
<tr>
<td>MA 121 Precalculus II</td>
<td>3</td>
</tr>
<tr>
<td>MA 153 Calculus and Analytical Geometry</td>
<td>3</td>
</tr>
<tr>
<td>or</td>
<td></td>
</tr>
<tr>
<td>MA 121 Precalculus II</td>
<td>3</td>
</tr>
</tbody>
</table>

Total General Education Requirements: 43-48

*Each BSBA major will be given a mathematics placement level when he/she enters UAH. The placement levels and appropriate courses are:

- Remedial: MA 004 or MA 033;
- Level I: MA 119 or MA 105;
- Level II: MA 121 or MA 143; or
- Level III: MA 153 or MA 151.

Prerequisite mathematics course below Level II will not count toward the 128 semester hour requirement for the BSBA degree. If a student plans to (a) emphasize quantitative methods in his program, or (b) minor in an area which will require at least two courses of the calculus sequence, or (c) attend graduate school, the prerequisite course must be taken.
school, then he/she should choose his/her mathematics course from the sequence MA 119, 121, 153, 154, 233, 244, 251, beginning with the course indicated by his/her placement level. At a minimum, work should be continued through MA 154. If a student’s plans do not require training past a minimum proficiency level, then mathematics course should be chosen from the sequence MA 105, 143, 151, 244, ST 281, beginning with the course indicated by the student’s placement level.

II. Pre-Business Administration Core Curriculum

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC 142</td>
<td>Principles of Economics I (Macroeconomics)</td>
<td>3</td>
</tr>
<tr>
<td>EC 143</td>
<td>Principles of Economics II (Microeconomics)</td>
<td>3</td>
</tr>
<tr>
<td>CS/MIS 201</td>
<td>Management Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MS 287</td>
<td>Statistical Analysis</td>
<td>3</td>
</tr>
<tr>
<td>AC 211</td>
<td>Principles of Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>AC 221</td>
<td>Accounting Lab I</td>
<td>0</td>
</tr>
<tr>
<td>AC 212</td>
<td>Principles of Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>AC 222</td>
<td>Accounting Lab II</td>
<td>0</td>
</tr>
</tbody>
</table>

Total Pre-Business Core Curriculum ........................................... 18

Upper Division Requirements: 62-67 Semester Hours

The structure of the degree program is such that a student normally will complete 61 to 66 semester hours of lower division requirements before entering the upper division School of Administrative Science courses. Specific requirements for admission into junior level School of Administrative Science courses are:

1. Successful completion of all pre-business administration core curriculum courses;
2. Successful completion of the mathematics, English composition, communication, library research** requirements;
3. A minimum grade of “C” in both English composition courses;
4. Completion of a minimum of 60 semester hours of course work; and
5. Admission to UAH as a regular student.

**Transfer students who have met all requirements except library research, may enroll in library research and junior level courses concurrently their first term at UAH.

Upper division course requirements are as follows:

1. Junior/Senior Business Administration Core Curriculum

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN 301</td>
<td>Principles of Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGT 301</td>
<td>Principles of Management</td>
<td>3</td>
</tr>
<tr>
<td>MKT 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>MS 385</td>
<td>Production/Operations Management</td>
<td>3</td>
</tr>
<tr>
<td>MGT 420</td>
<td>Business Policy</td>
<td>3</td>
</tr>
</tbody>
</table>
Social, Legal and Ethical Environment of Business requirement. See individual major options ....................... 3
International Business requirement. See individual major options .......................................................... 3

2. EH 301 Strategies of Business Writing ................................. 3
3. Major Option ......................................................... 15-27
4. BSBA degree program may also include an appropriate minor. This may require the student to complete more than 128 hours ................................................. (21)
5. Non-Administrative Science electives***must be selected from courses outside the School of Administrative Science .......................................................... 15
6. Free Electives***may be selected from any School within the University ........................................... 1-13

Total Upper Division Requirements ........................................ 62-67
Total minimum degree requirements ........................................ 128

***No more than 6 hours of HPE activity and music ensemble courses may count toward graduation.

Major Options in the BSBA Degree

Accounting

The major in Accounting is intended to prepare students for careers in the following areas: (1) public accounting; (2) management accounting as cost accountants or controllers; and (3) governmental accounting at the federal, state, and local levels. The program also provides an excellent foundation for graduate study in law and management, and for other careers. All accounting requirements for the BSBA with a major in accounting must be completed in not more than seven years. Credit for individual undergraduate accounting courses taken more than seven years but less than ten years before completion of all requirements for the degree may be validated by a special examination by the department concerned. Such an examination will be equivalent to a comprehensive final examination in the course. A student may take such an examination to validate a particular course only once.

Students pursuing a BSBA with a major option in accounting must meet the following requirements:

Social, Legal, and Ethical Environment of Business requirement is satisfied by completing BLS 221, AC 415 and AC 431.

International Business requirement is satisfied by completing any one of the following courses: AC 450, EC 546, FIN 554, MGT 520, MKT 515.

Semester Hours

AC 310 Intermediate Accounting I ........................................ 3
AC 311 Intermediate Accounting II ...................................... 3
AC 312 Intermediate Accounting II ...................................... 3

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Economics

The undergraduate curriculum in economics offers the student two curricula of study. One is the liberal arts curriculum which leads to the BA degree. (See section on Bachelor of Arts in Economics Degree Requirements) The other is applied economics curriculum that leads to the BSBA degree with a major option in economics. Both curricula require the student to have a thorough grounding in economic theory.

The BSBA curriculum emphasizes the applied aspects of economic analysis providing the student with a solid foundation for careers in business, government, and industry. This avenue of study is especially valuable when taken in relation to options in accounting, management, marketing, industrial and systems engineering, computer science, and related fields. This educational experience is appropriate for possible careers in banking, market forecasting, and business data and economic data analysis. The program also provides excellent preparation for students interested in pursuing graduate study in business, economics, and other applied fields.

Students pursuing a BSBA with a major option in economics must meet the following requirements:

Social, Legal, and Ethical Environment of Business requirement is satisfied by completing BLS 211 or MGT/MKT 430.

International Business requirement is satisfied by completing any one of the following courses: EC 546, FIN 554, MGT 520, MKT 515.

Semester Hours

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC 310 Introduction to the Use of Mathematics in Economics and Business</td>
<td>3</td>
</tr>
<tr>
<td>EC 325 Intermediate Economic and Business Statistics</td>
<td>3</td>
</tr>
<tr>
<td>EC 430 Introduction to Econometrics</td>
<td>3</td>
</tr>
<tr>
<td>EC 340 Macroeconomic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EC 345 Microeconomic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EC 341 History of American Economic Growth</td>
<td>3</td>
</tr>
<tr>
<td>EC 448 Development of Economic Theory</td>
<td>3</td>
</tr>
<tr>
<td>Three hours from the following:</td>
<td>3</td>
</tr>
<tr>
<td>EC 322 Public Policy Toward Business</td>
<td>3</td>
</tr>
<tr>
<td>EC 352 Money and Banking</td>
<td>3</td>
</tr>
<tr>
<td>EC 585 Comparative Economic Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

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Finance

The major in finance is intended to provide students with the tools of financial analysis. This prepares students for careers with organizations which require a special understanding of financial problems and financial systems. These positions may be in financial institutions such as banks, insurance companies, and real estate firms; and the finance, accounting or systems departments of business corporations.

Students pursuing a BSBA with a major option in finance must meet the following requirements:

Social, Legal, and Ethical Environment of Business requirement is satisfied by completing BLS 211 or MGT/MKT 430.

International business requirement is FIN 554

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN 352</td>
<td>3</td>
</tr>
<tr>
<td>FIN 375</td>
<td>3</td>
</tr>
<tr>
<td>FIN 362</td>
<td>3</td>
</tr>
<tr>
<td>FIN 431</td>
<td>3</td>
</tr>
<tr>
<td>FIN 550</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

Management

A major in management enables the student to develop a better understanding of the social, political, and industrial society in which we live. Such an understanding complements the skills developed in human resource management which are necessary to the effective and efficient operation of a wide range of governmental, business, and industrial organizations. Professionally, this major prepares the student for careers in a wide range of organizational activities including personnel, planning, and general management. It can also provide the necessary foundation for graduate work in management or business.

Students pursuing a BSBA with a major option in management must meet the following requirements:

Social, Legal, and Ethical Environment of Business requirement is MGT 430.

International Business requirement is satisfied by completing any one of the following: EC 546, FIN 554, MGT 520*, MKT 515.

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGT 361</td>
<td>3</td>
</tr>
<tr>
<td>MGT 362</td>
<td>3</td>
</tr>
<tr>
<td>MGT 363</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>86</td>
</tr>
</tbody>
</table>
Marketing is the study of all the activities necessary to move products from the producer to the consumer. It includes the study of consumers and their behavior in the market, the channels of distribution, promotional consideration, and other related topics. A degree in marketing prepares the student for careers with manufacturers, distributors, retailers, government, and many in other business operations.

Students pursuing a BSBA with a major option in marketing must meet the following requirements:

Social, Legal, and Ethical Environment of Business requirement is satisfied by completing MKT 430* or BLS 211.

International Business requirement is satisfied by completing any one of the following: EC 546, FIN 554, MGT 520, MKT 515**.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKT 332</td>
<td>Consumer Behavior</td>
<td>3</td>
</tr>
<tr>
<td>MKT 342</td>
<td>Promotional Strategy</td>
<td>3</td>
</tr>
<tr>
<td>MKT 343</td>
<td>Market Research</td>
<td>3</td>
</tr>
<tr>
<td>MKT 345</td>
<td>Market Channel Structure and Strategy</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Six hours from the following:</strong></td>
<td><strong>6</strong></td>
</tr>
<tr>
<td>MKT 410</td>
<td>Marketing Management</td>
<td>3</td>
</tr>
<tr>
<td>MKT 414</td>
<td>Industrial Marketing</td>
<td>3</td>
</tr>
<tr>
<td>MKT 415</td>
<td>Sales Management and Professional Selling</td>
<td>3</td>
</tr>
<tr>
<td>MKT 416</td>
<td>Retailing Policy and Management</td>
<td>3</td>
</tr>
<tr>
<td>MKT 430</td>
<td>Business and Society*</td>
<td>3</td>
</tr>
<tr>
<td>MKT 515</td>
<td>International Marketing**</td>
<td>3</td>
</tr>
<tr>
<td>MKT 560</td>
<td>Seminar in Marketing</td>
<td>3</td>
</tr>
</tbody>
</table>

*Students who take MKT 430 to satisfy the Environment of Business requirement must select another course from this list.

**Students who take MKT 515 to satisfy the International Business requirement must select another course from this list.
Procurement Management

A major in procurement management has as its primary objective the preparation of qualified students for careers in procurement management in federal, state and local government agencies as well as the private sector. In order to achieve these objectives, the program stresses a broad foundation in the essential elements of business administration, and a specialization in procurement management.

Students pursuing a BSBA with a major option in procurement management must meet the following requirements:

Social, Legal, and Ethical Environment of Business requirement is BLS 211.

International Business requirement is satisfied by completing any one of the following: EC 546, FIN 554, MGT 520, MKT 515.

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PR 301</td>
<td>Introduction to Procurement</td>
</tr>
<tr>
<td>PR 302</td>
<td>Contract Administration</td>
</tr>
<tr>
<td>PR 303</td>
<td>Cost and Price Analysis</td>
</tr>
<tr>
<td>PR 404</td>
<td>Negotiation Techniques</td>
</tr>
<tr>
<td>PR 405</td>
<td>Government Contract Law</td>
</tr>
<tr>
<td>MGT 430</td>
<td>Business and Society</td>
</tr>
<tr>
<td>MKT 345</td>
<td>Market Channel Structure and Strategy</td>
</tr>
<tr>
<td>a course approved by the adviser</td>
<td>3</td>
</tr>
</tbody>
</table>

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Management Information Systems

A student may pursue a composite major in management information systems. This major involves a combination of disciplines in the School of Administrative Science and the School of Mathematical and Natural Sciences. The Management Information Systems curriculum differs from the Computer Science curriculum in the environment in which the program is taught, the employment environment for the graduate, and the depth of technical expertise required.

a. The management information systems curriculum teaches information system concepts and processes within the two contexts of organization functions and management knowledge and technical information systems knowledge, whereas computer science tends to be taught within an environment of mathematics, algorithms, and engineering technology.

b. The management information systems graduate is expected to work within the environment of an organization and to interact with both
organizational functions and computer technology. The computer science graduate has less interaction with organizational functions and more interaction with hardware and software technology.

c. In technical expertise, the management information systems curriculum places a substantial emphasis on the ability to develop a management information systems structure for an organization and to design and implement applications. There is less emphasis on skills and hardware and software design. The computer science graduate typically has less exposure to management information requirements analysis and organizational considerations but obtains greater expertise in algorithm development, programming, system software and hardware.

Students pursuing a BSBA degree with a composite major in management information systems must meet the following requirements:

Social, Legal, and Ethical Environment of Business requirement is satisfied by completing BLS 211 or MGT/MKT 430.

International Business requirement is satisfied by completing any one of the following: AC 450, EC 546, FIN 554, MGT 520, MKT 515.

The student completes either the Technical Emphasis Program or the Administrative Emphasis Program.

Technical Emphasis Program: Semester Hours

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 113</td>
<td>Computer Programming</td>
<td>3</td>
</tr>
<tr>
<td>CS 208</td>
<td>Computer Organization and Advanced Programming I</td>
<td>3</td>
</tr>
<tr>
<td>CS 308</td>
<td>Computer Organization and Advanced Programming II</td>
<td>3</td>
</tr>
<tr>
<td>CS/MIS 311</td>
<td>Computer Applications in Economics and Business I</td>
<td>3</td>
</tr>
<tr>
<td>AC/MIS 307</td>
<td>Accounting Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>CS/MIS 411</td>
<td>Computer Applications in Economics and Business II</td>
<td>3</td>
</tr>
<tr>
<td>MGT/MIS 412</td>
<td>Information Systems Design and Implementation</td>
<td>3</td>
</tr>
</tbody>
</table>

21

Administrative Emphasis Program: Semester Hours

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 211</td>
<td>Introduction to Computers in Business</td>
<td>3</td>
</tr>
<tr>
<td>CS 310</td>
<td>Introduction to Business Data Processing.</td>
<td>3</td>
</tr>
<tr>
<td>AC/MIS 307</td>
<td>Accounting Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>CS/MIS 411</td>
<td>Computer Applications in Economics and Business II</td>
<td>3</td>
</tr>
<tr>
<td>MGT/MIS 412</td>
<td>Information Systems Design and Implementation</td>
<td>3</td>
</tr>
</tbody>
</table>

Six hours from the following: 

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 113</td>
<td>Computer Programming</td>
<td>3</td>
</tr>
<tr>
<td>CS 208</td>
<td>Computer Organization and Advanced Programming I</td>
<td>3</td>
</tr>
<tr>
<td>CS 308</td>
<td>Computer Organization and Advanced Programming II</td>
<td>3</td>
</tr>
</tbody>
</table>

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### Suggested Schedule of Courses for Full-Time Students Seeking a BSBA Degree

(Semester hours credit in parentheses)

<table>
<thead>
<tr>
<th>Year</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
<th>Year Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Freshman</strong></td>
<td>EH 101 (3)</td>
<td>EH 102 (3)</td>
<td>CM 113 (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MA 143/121 (3)</td>
<td>EC 142 (3)</td>
<td>EC 143 (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Humanities (3)</td>
<td>Soc Sci (3)</td>
<td>Soc Sci (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MA 151/153 (3)</td>
<td>Humanities (3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>CS 201 (3)</td>
<td>MS 287 (3)</td>
<td>AC 212 (3)</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Humanities (3)</td>
<td>AC 211 (3)</td>
<td>AC 222 (0)</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Science (4)</td>
<td>AC 221 (0)</td>
<td>Soc Sci (6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Science (4)</td>
<td>BIB 230 (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Humanities (3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>13</td>
<td>33</td>
</tr>
<tr>
<td><strong>Sophomore</strong></td>
<td></td>
<td></td>
<td></td>
<td>66</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Junior</strong></td>
<td>EH 301 (3)</td>
<td>MKT 301 (3)</td>
<td>Major 2 (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FIN 301 (3)</td>
<td>MS 385 (3)</td>
<td>Electives (4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MGT 301 (3)</td>
<td>Major 1 (3)</td>
<td>Environment</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Elective (4)</td>
<td>of Bus (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9</td>
<td>13</td>
<td>32</td>
</tr>
<tr>
<td><strong>Senior</strong></td>
<td>Major 3 (3)</td>
<td>Major 5 (3)</td>
<td>MGT 420 (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Major 4 (3)</td>
<td>Int'l Bus (3)</td>
<td>Major 6 (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electives (6)</td>
<td>Elective (3)</td>
<td>Elective (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
<td>9</td>
<td>30</td>
</tr>
<tr>
<td><strong>Four Year Total</strong></td>
<td></td>
<td></td>
<td></td>
<td>128</td>
</tr>
</tbody>
</table>
Possible Minors for the BSBA Major

BSBA Minor in Computer Science

A student desiring a minor in computer science must complete 21 hours of courses in computer science. A computer science minor consists of the following courses: CS 113, 208, 214, 308, 311, 411 and one of the following: CS 501, 513, or 517.

BSBA Minor in Economics

A student desiring a minor in economics must complete 21 hours of courses in Economics including 6 semester hours in courses numbered 300 or above or courses offered in economics as part of an area of cognate studies with other disciplines including 12 semester hours, 6 of which must be in courses numbered 300 or above. See Economics Minors section for examples of possible minor programs in economics.

BSBA Minor in Interpersonal and Organizational Communications

The following communication minor has been approved for BSBA majors: CM 113, CM 130, CM 330, CM 310, CM 311, and CM 350 or CM 450.

BSBA Minor in Mathematics

The following are examples of approved mathematics minors for business majors:

- MA 153, 154, 233, 244, 251, and either
  - a. ST 281, ST 387, MA 385; or
  - b. MA 352, 385; or
  - c. MA 385, 415.

Students who feel that substitutions can produce a minor better suited for their needs should consult their faculty adviser about the feasibility of such substitutions.

BSBA Minor in Foreign Language

For BSBA majors interested in career opportunities in international business, the following foreign language minor has been approved:

- Elementary FL (French, German, Russian, Spanish)
  - FL* 101, 102 or 103, 104 ........................................ 6
- Intermediate FL (French, German, Russian, Spanish)
  - FL 201, 202 or 203 ............................................. 3-6
- Advanced Conversation FL 3-- .................................... 3
- Advanced Composition FL 3-- .................................... 3
- Culture FL 3-- .................................................... 3
- Business and Professions FL 3-- ................................. 3

21-24

*FL A foreign language from French, German, Russian or Spanish.
BSBA Minor in Psychology

A BSBA major who chooses a minor in psychology must take a minimum of 21 hours, selected with the assistance of a psychology adviser, including PY 103, PY 230, and either one experimental psychology course or one human research course.

Administrative Science as a Minor

A student who is majoring in another discipline and is interested in an administrative science minor may choose a minimum of 21 semester hours. The following courses should be included in the 21 hour minor: AC 211, AC 221, AC 212, AC 222 FIN 301, MGT 301, MKT 301. The student may choose 6 additional hours from other administrative science offerings. Other minors can be arranged in consultation with the School's Programs Office.

Certificate in Accounting

Many individuals have expressed a desire to change career goals after receiving a bachelor’s degree. One career goal requested has been for preparation in the field of accounting. Alabama requires an individual to have a bachelor’s degree (not necessarily in accounting) and as many credit hours in accounting as the student would have if he/she had majored in accounting. To meet students’ changing career objectives and to meet minimum requirements so that students may take the CPA examination in Alabama, a Certificate of Accounting Program is offered. Admission to the program is limited to those students who have a bachelor’s degree in a field other than accounting.

The requirements for a Certificate in Accounting are set out below. It takes approximately two years to complete this program, because of the sequence of courses and prerequisites.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIS 201</td>
<td>Management Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MS 287</td>
<td>Statistical Analysis</td>
<td>3</td>
</tr>
<tr>
<td>BLS 221</td>
<td>Business Law I</td>
<td>3</td>
</tr>
<tr>
<td>AC 211</td>
<td>Principles of Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>AC 212</td>
<td>Principles of Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>AC 310</td>
<td>Intermediate Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>AC 311</td>
<td>Intermediate Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>AC 312</td>
<td>Intermediate Accounting III</td>
<td>3</td>
</tr>
<tr>
<td>AC 313</td>
<td>Income Tax I</td>
<td>3</td>
</tr>
<tr>
<td>AC 314</td>
<td>Cost Accounting</td>
<td>3</td>
</tr>
<tr>
<td>AC 415</td>
<td>Advanced Accounting</td>
<td>3</td>
</tr>
<tr>
<td>AC 431</td>
<td>Auditing I</td>
<td>3</td>
</tr>
</tbody>
</table>

One of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC 432</td>
<td>Auditing II</td>
<td>3</td>
</tr>
<tr>
<td>AC 417</td>
<td>Government Accounting</td>
<td>3</td>
</tr>
<tr>
<td>AC 323</td>
<td>Income Tax II</td>
<td>3</td>
</tr>
<tr>
<td>BLS 231</td>
<td>Business Law II</td>
<td>3</td>
</tr>
</tbody>
</table>
The student must counsel with the Coordinator of Undergraduate Advisement, have the approval of the Accounting/Business Legal Studies Coordinator, and have been admitted to UAH as a regular student before enrolling in the program. A maximum of 12 hours will be accepted by transfer credit to apply to the Certificate in Accounting program. See the Administrative Science School's policy on Transfer Students.

Bachelor of Arts in Economics Degree Requirements

The BA in economics curriculum emphasizes the liberal arts aspects of economic study providing the student with a greater appreciation and understanding of the economic, cultural, and political environment of our society. This avenue of study is especially useful to students interested in pursuing graduate study in economics or other related academic fields. The BA degree in economics is also an excellent preparation for students planning careers in business, law the foreign service or other related professions.

The School of Administrative Science requires that the student desiring an Area of Concentration (AOC) in economics must satisfy the general education requirements for the BA degree.

General Education Requirements: Semester Hours

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Composition</td>
<td>6</td>
</tr>
<tr>
<td>Survey of Literature</td>
<td>6</td>
</tr>
<tr>
<td>Origins and Development of the Contemporary World</td>
<td>6</td>
</tr>
<tr>
<td>Foreign Language</td>
<td>6-12</td>
</tr>
<tr>
<td>Social Science (EC 142-143)</td>
<td>6</td>
</tr>
</tbody>
</table>

One of the following Science-Mathematics options:

a. Mathematics, 6 hours; one laboratory science, 8 hours. 14
b. Two laboratory sciences. 16
c. Mathematics, 3 hours; one laboratory science, 8 hours; another laboratory science, 4 hours. 15
d. Mathematics, 3 hours; natural science sequence, 12 hours (NS 111, 112, 113). 15

Total General Education Requirements 44-52

Economics Major (Minimum requirements):

Economics Core (including MSC 287, EC 310 340, 341, 345, 352, 448). 21
Economics Electives (must be preapproved by the student's economics adviser). 15
Minor (see examples below). 21
Electives (total number of semester hours to 128). 25-33

At Least 128
An example of an AOC for a degree in economics for students interested in graduate work in economics:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSC 287</td>
<td>Business Statistical Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EC 310</td>
<td>Introduction to the Use of Mathematics in Economics</td>
<td>3</td>
</tr>
<tr>
<td>EC 322</td>
<td>Public Policy Toward Business</td>
<td>3</td>
</tr>
<tr>
<td>EC 325</td>
<td>Intermediate Statistics</td>
<td>3</td>
</tr>
<tr>
<td>EC 340</td>
<td>Macro Economics Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EC 341</td>
<td>History of American Economic Growth</td>
<td>3</td>
</tr>
<tr>
<td>EC 345</td>
<td>Micro Economic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EC 352</td>
<td>Money and Banking</td>
<td>3</td>
</tr>
<tr>
<td>EC 430</td>
<td>Introduction to Econometrics</td>
<td>3</td>
</tr>
<tr>
<td>EC 448</td>
<td>Development of Economic Theory</td>
<td>3</td>
</tr>
<tr>
<td>EC 460</td>
<td>Problems in Economics</td>
<td>3</td>
</tr>
<tr>
<td>EC 585</td>
<td>Comparative Economic Systems</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>36</td>
</tr>
</tbody>
</table>

An example of an AOC for a degree in economics for students interested in entering the labor force:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC 211</td>
<td>Principles of Accounting</td>
<td>3</td>
</tr>
<tr>
<td>AC 221</td>
<td>Accounting Lab I</td>
<td>0</td>
</tr>
<tr>
<td>MGT 301</td>
<td>Principles of Management</td>
<td>3</td>
</tr>
<tr>
<td>MSC 287</td>
<td>Business Statistical Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EC 310</td>
<td>Introduction to the Use of Mathematics in Economics</td>
<td>3</td>
</tr>
<tr>
<td>EC 321</td>
<td>Engineering Economy</td>
<td>3</td>
</tr>
<tr>
<td>EC 322</td>
<td>Public Policy Toward Business</td>
<td>3</td>
</tr>
<tr>
<td>EC 325</td>
<td>Intermediate Statistics</td>
<td>3</td>
</tr>
<tr>
<td>EC 340</td>
<td>Macro Economic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EC 341</td>
<td>History of American Economic Growth</td>
<td>3</td>
</tr>
<tr>
<td>EC 345</td>
<td>Micro Economic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EC 352</td>
<td>Money and Banking</td>
<td>3</td>
</tr>
<tr>
<td>EC 430</td>
<td>Advanced Economic and Business Statistics</td>
<td>3</td>
</tr>
<tr>
<td>EC 448</td>
<td>Development of Economic Theory</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>39</td>
</tr>
</tbody>
</table>

The following examples are typical of minors for students who major in economics. Students who feel that substitutions can produce a program better suited to their needs, should consult their faculty adviser.

**Mathematics** — MA 153, 154, 233, 244, 251, 352, and 385.

**Operation's Research** — CS 113, EG 220, 320, 390, 421, 527, and 522 or 526.
Industrial Engineering — EG 220, 320, 321, 390, 421, 524, and 523 or 526.

Computer Science — CS 113, 208, 214, 308 and any 9 hours from one of the following options: CS 311, 411, 513, 517, 524, 530; CS 309, 415, 513, 517, 520, 530.

Other — A minor of 21 hours in one discipline, including at least 6 hours numbered above 300 approved by the department concerned and the student’s economics faculty adviser.

Economics Minor

A student having an area of interest in a discipline other than economics, but wishing a minor in economics, may choose in consultation with and approval of the Economics faculty 21 semester hours of appropriate courses in economics including 6 semester hours in courses numbered 300 or above or courses offered in economics as part of an area of cognate studies with other disciplines including a minimum of 12 semester hours, 6 of which must be in courses numbered 300 or above.

The following are examples of approved minors for students with a major in various other disciplines:

Mathematics — EC 142, 143, 352, MSC 287 and 9 hours from EC 340, 341, 345, 430 and 448.

History or Political Sciences — EC 142, 143, 322, 341, 344, 353, 585.

Psychology or Sociology — EC 142, 143, 322, 325, 341, 430, 585.

Economics for Second Area of Study

Students majoring in elementary education may select economics as their second area of study. Major requirements can be found in the education section.

To meet University requirements, a minimum of 18 hours, 15 of which must be upper level, are to be selected from courses listed below with the help of the economics education faculty adviser and approved by the Dean of the School of Administrative Science. This curriculum may require more than the minimum of 128 hours for the degree.

Undergraduate Course Offerings

All students, both administrative science and non-administrative science, must meet general School of Administrative Science prerequisite requirements for upper division administrative science courses, in addition to the specific course prerequisites cited in the course descriptions. General prerequisites for all upper division administrative science courses are the completion of EH 101-102 or 103-104, junior status (completion of at least 60 semester hours), and admission to UAH as a regular student.
Accounting (AC)

211 Principles of Accounting I 3 hrs.
A basic conceptual and practical approach to the art of accounting. Recording, measuring, and communicating the accounting data of business entities. Data creation and accumulation on the basis of the double-entry theory. Development, structure, content and analysis of the principal accounting financial statements. Prerequisites: sophomore standing or written approval of the dean. Parallel: AC 221.

212 Principles of Accounting II 3 hrs.
Basic external financial statements with attention to special accounting problems of partnerships and corporations. Introduction to management accounting with emphasis on the development and interpretation of cost and revenue data for management decision-making. Parallel: AC 222. Prerequisite: AC 211.

221 Accounting Lab I 0 hrs.
Laboratory work complements lecture material for AC 211 by providing review of basic accounting principles and practice sets. Parallel AC 211. Lab fee: Level 2.

222 Accounting Lab II 0 hrs.
Laboratory work complements lecture material for AC 212 by providing review of basic accounting principles and practice sets. Parallel: AC 212. Lab fee: Level 2.

307 Accounting Information Systems 3 hrs.
Design, operation, analysis of accounting information systems with respect to data input, processing, storage, recall, security, internal control, and the audit trail. Emphasis will be placed on computerized systems. Lab fee: Level 3. Prerequisites: MIS 201, AC 212. (Same as MIS 307).

310 Intermediate Accounting I 3 hrs.

311 Intermediate Accounting II 3 hrs.

312 Intermediate Accounting III 3 hrs.
Stockholders equity section of the balance sheet including the computation of earnings per share (EPS) for companies with complex capital structures and a study of selected special topics in financial accounting theory. Corporate formation, contributed capital, retained earnings, dividends. Contraction and expansion of corporate capital after formation; complex EPS calculations, long-term debt. Statement of changes in financial position, pensions, leases, analysis of financial statements, interim statements, disclosure requirements, and other contemporary topics. Prerequisite: AC 311.

313 Income Tax I 3 hrs.
Determination of taxable income, business and nonbusiness deductions, and selected aspects of tax accounting for individuals and sole proprietorships. Prerequisites: AC 212.

314 Cost Accounting 3 hrs.
Role and importance of cost and revenue data. Various cost systems applicable to the process of management decision-making. Prerequisite: AC 212.
317 Governmental (Fund) Accounting 3 hrs.
Fund accounting at state and local government levels. Special accounting principles, budgeting, accounting for various funds and account groups, reporting requirements and auditing. Prerequisite: AC 212.

323 Income Tax II 3 hrs.
Tax accounting for partnerships, corporations, Sub, S corporations, estates, and trusts, social security taxes, tax audits, and tax research. Prerequisites: AC 313.

415 Advanced Accounting 3 hrs.
Specialized accounting including partnerships, business combinations, international operations, corporate liquidations and reorganization, estates and trusts, and governmental accounting. Prerequisite: AC 312.

420 Internship in Accounting 3 hrs.
Under the direction of a faculty adviser, employment experience with public accounting firms or industrial firms. Prerequisite: Written approval of the dean and senior standing.

431 Auditing I 3 hrs.
Conceptual foundations of auditing practice. Basic auditing concepts, including professional ethics, independence, and due audit care. Auditing of electronic data processing systems, statistical sampling, legal liability, and standards of reporting. Prerequisites: AC 312, MSC 287 and senior standing.

432 Auditing II 3 hrs.
Practical application of auditing concepts and standards. A hypothetical audit of a selected business centered around a practice case and audit steps required in each phase of the annual examination. Initial client contact, engagement letter, review of internal controls, audit program, compliance testing, substantive testing of various accounts, working-paper form and technique, proper documentation, closing the audit, assembling financial statements, adequate disclosure, opinion and exit-client conference. Prerequisite: AC 431 and senior standing.

450 Studies in International Accounting 3 hrs.
Differences in principles of accounting and auditing standards, and auditing procedures in selected countries of the world. Prerequisite: AC 312 and senior standing.

460 Controllership 3 hrs.
Interrelationship of managerial accounting and analytical, behavioral, and technological considerations in the analysis and design of planning and control systems. Investigation of goals of firms and organizational structures for specifying system requirements. Discussion and evaluation of the component elements of these systems against system requirements and the present. Future roles of management accounting within the scope of management information and control systems. Case studies for illustration. Prerequisite: AC 314 and senior standing.

470 Seminar in Contemporary Issues of Accounting 3 hrs.

490 Special Projects 3 hrs.
Active involvement in an on-going project in a business enterprise that has particular interest and relevance to the student or an in-depth investigation of contemporary Accounting problems. Prerequisites: senior standing and approval of the area coordinator.
Business Legal Studies (BLS)

211 Legal Environment of Business 3 hrs.
A study of the legal environment of business including ethical, social, and political influences on both profit and non-profit organizations.

221 Business Law I 3 hrs.
Introduction to law, contracts, torts, sales and conditional sales, negotiable instruments, commercial paper, personnel, agency, and employment. Basic free enterprise, legal concepts of contracts, and operation of the court system.

231 Business Law II 3 hrs.
Partnerships, corporations, legal problems of business organization, insurance, security devices, personal property, real property, leases, trusts and estate administration. Prerequisite: BLS 221.

Economics (EC)

No student may enroll in courses out of sequence without approval of the economics faculty.

142 Principles of Economics I 3 hrs.
Economic analysis and its application in investigating the economic functional relation between business, consumers, and government. National income analysis, determination of employment and price levels, and introduction to market demand and supply analysis. Lab fee: Level 2. Prerequisite: MA 104 or 105 or recommended equivalent.

143 Principles of Economics II 3 hrs.
Continuation of EC 142. More advanced value theory and its application to analysis of market performance under conditions ranging from competitive to monopolistic, including consideration of distribution along functional lines, and economic growth. Lab fee: Level 2. Prerequisite: EC 142.

235 Economic Geography 3 hrs.
Spatial relationships between various resources; location factors in primary, secondary, and tertiary activities; geographic patterns of production, processing, and distribution of commodities.

241 Marketing Economics 3 hrs.
Survey. Marketing activities, principles, structures, functions, policies, prices, costs, and quantitative problems from social, consumer, and management points of view. Prerequisite: EC 143

300 Marxian Economics 3 hrs.
Economic theory of capitalism as developed in writings of Marx, Engles, and Lenin. Marx's theory of labor value, theory of crises, and theory of imperialism. Marxist theory in terms of its place in history of economic thought as contrasted with the more recent analytical approach to the study of a capitalistic system. Prerequisite: approval of the instructor.

310 Introduction to the Use of Mathematics in Economics and Business 3 hrs.
Review of algebra and introduction to matrix algebra and calculus with application to economic and business problems. Prerequisite: EC 143, MA 105 or its equivalent.

311 Computer Applications in Economics and Business I 3 hrs.
Business systems and data processing procedures; impact of data processing methods on the economic structure of business. User communication, file design, report control, documentation. Data Bases, information collection, planning and control, systems design concepts including COBOL. Lab fee: Level 3. Prerequisite: CS 208. Not open to students who have had CS 211 or CS 310. Same as MIS 311 and CS 311.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>315</td>
<td>Urban Economics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Urban phenomena and problems. Central place theory, location theory, and externalities. Location patterns and changes within metropolitan areas. Analysis of selected urban problems. Roles of private and public sectors in urban development.</td>
<td></td>
</tr>
<tr>
<td>321</td>
<td>Engineering Economy</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Economic evaluation of engineering alternatives. Interest, depreciation, time-value of investments, learning curves, and replacement analysis. Prerequisite: EC 142, MA 233, or EC 310. (Same as EG 321).</td>
<td></td>
</tr>
<tr>
<td>322</td>
<td>Public Policy Toward Business</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>View of impact of government on operations of business firms: consumer product regulation, job-safety regulation, environment, regulation of personnel practices, government procurement, and antitrust regulation. (Same as MGT 322)</td>
<td></td>
</tr>
<tr>
<td>325</td>
<td>Intermediate Economic and Business Statistics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Probability and probability distributions, sampling theory and statistical inference, analysis of variance, linear regression and correlation, analysis of time series, and index numbers and their construction. Lab fee: Level 2. Prerequisite: MSC 287 or its equivalent. (Same as MGT 322).</td>
<td></td>
</tr>
<tr>
<td>340</td>
<td>Macro Economic Analysis</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Comprehensive study of national economy system. Interdependent market processes in determining income, consumption, saving, investment, interest, employment, and the price level. Economic growth as influenced by institutional structure, technological change, business management, and government monetary and fiscal policy. Application of economic accounting structure and method. Prerequisite: EC 143, EC 310, or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>341</td>
<td>History of American Economic Growth</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Origins of basic economic institutions in Europe; detailed historical development of these institutions in the United States. Prerequisite: EC 143 or permission of instructor.</td>
<td></td>
</tr>
<tr>
<td>344</td>
<td>European Economic History</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Industrial Revolution to current developments covering institutions, activities, economic systems, and policies. Prerequisite: EC 143 or permission of instructor.</td>
<td></td>
</tr>
<tr>
<td>345</td>
<td>Micro Economic Analysis</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Economic principles underlying value and distribution with additional training in application of these principles to problems of analysis. Prerequisite: EC 143, EC 310, or its equivalent.</td>
<td></td>
</tr>
<tr>
<td>352</td>
<td>Money and Banking</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Organization, operation, and economic significance of monetary and banking systems. Prerequisite: EC 143. (Same as FIN 352).</td>
<td></td>
</tr>
<tr>
<td>353</td>
<td>Public Finance</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Principles of taxation, government expenditures, borrowing, and fiscal administration. Prerequisite: EC 143. (Same as FIN 353).</td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>The Soviet Economy</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Soviet economic theory and strategy for economic growth; practice of economic planning, resource development and utilization, interpretation of economic performance, and comparison with China.</td>
<td></td>
</tr>
<tr>
<td>411</td>
<td>Computer Applications in Economics and Business II</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Techniques in economic business modeling, case studies of business applications and computer simulation of business operations. Projects requiring independent research. Lab fee: Level 3. Prerequisite: EC 311, MIS 311 or CS 311 or CS 310. (Same as CS 411 or MIS 411).</td>
<td></td>
</tr>
</tbody>
</table>
Introduction to Econometrics for Economics and Business Applications
3 hrs.
Review inferential statistics, statistical relationship of economic and business models (signal-equation versus simultaneous-equation models), multiple regression techniques and their application to estimation of economic and business models. Lab fee: Level 2. Prerequisite: EC 310, 340, or 345 or MSC 385, MSC 287 or approval of instructor.

Development of Economic Theory
3 hrs.
Historical development of economic thought from ancient times to the nineteenth century and from early modern times to present. Prerequisite: EC 345.

State and Local Finance
3 hrs.
Administration, fiscal importance, and economic effects of state and local finances. Recent trends in state and local revenue and expenditure and their significance. Prerequisite: EC 142. (Same as FIN 452).

Problems in Economics
3 hrs.
Special topics in areas of student interest. Prerequisite: approval of instructor.

International Economics and Trade
3 hrs.
Theoretical principles underlying international trade with application of these principles to recent historical developments and to current national policies. Prerequisite: EC 345 or approval of instructor. Approval of area coordinator for noneconomic majors.

Regional Economics
3 hrs.
Location theory and regional economics, factors affecting location of economics activity, consideration of differential growth rate among regions, and introduction to methods of regional analysis. Prerequisite: senior or graduate standing or approval of area coordinator.

Comparative Economic Systems
3 hrs.
Principal economic systems comparing resource allocation consumption, pricing, production, investment, income distribution, and central planning. Prerequisite: senior or graduate standing or the approval of area coordinator.

Finance (FIN)

Personal Finance
3 hrs.
Problems and techniques of family financial planning. Benefits and warnings relative to consumer credit, insurance, home ownership, and personal investing in light of current economic and legal constraints.

Principles of Finance
3 hrs.
A study of finance in the operation and organization of business enterprises. Short and long-term (capital) budgeting, ratio analysis, working-capital management, and valuation of the firm. Prerequisite: AC 212 and EC 143.

Money and Banking
3 hrs.
Organization, operation, and economic significance of monetary and banking systems. Prerequisite: EC 143. (Same as EC 353).

Public Finance
3 hrs.
Principles of federal government taxation and expenditures, borrowing, and fiscal administration. Prerequisite: EC 143. (Same as EC 353).

Security Analysis and Portfolio Management
3 hrs.
Approaches to investment strategy and decision-making. Valuation of securities and import of dividend policy and capital structure. Principles underlying security selections, timing, and diversification to achieve optimum balance for various investment goals. Prerequisite: FIN 301.
Financial Institutions 3 hrs.
Role and activities of financial intermediaries as they affect flow of funds and capital formation. Money markets and capital markets in which these institutions operate. Prerequisite: FIN 301.

Business Analysis for Financial Managers 3 hrs.
Specific decision-making problems encountered by financial managers. Attention will be given to the over-all financial environment and how monetary regulations affect it. Prerequisite: FIN 301.

Managerial Finance and Policy Determination 3 hrs.
Use of advanced cases in financial management to analyze function of the financial executive. Development of ability to analyze different types of managerial problems with tools acquired in earlier courses. Prerequisite: FIN 301 and senior standing.

State and Local Finance 3 hrs.
Administration, fiscal importance and economic effects of state and local finances. Recent trends in state and local revenue and expenditure and their significance. Prerequisite: EC 142 and senior standing. (Same as EC 452).

Special Projects 3 hrs.
Active involvement in an on-going project in a business enterprise that has particular interest and relevance to the student or an in-depth investigation of contemporary finance problems. Prerequisites: senior standing and approval of the area coordinator.

Seminar in Finance 3 hrs.
Extensive readings and reports reflecting current developments and trends in financial theory and its applications to the decision-making process. Development of a logical approach to financial problems using accepted techniques of financial analysis. Prerequisite: FIN 431, senior or graduate standing or approval of area coordinator.

International Finance 3 hrs.
Behavior of foreign-exchange rates under different monetary standards, methods of financing international trade, historical development of international financial institutions, current and proposed methods for fostering international trade, and problems of international liquidity. Prerequisite: FIN 352 (EC 352), senior, graduate standing or approval of area coordinator.

Monetary and Credit Policy 3 hrs.
Influence of governmental monetary policies on money supply, price level, interest rates, and employment with emphasis on maintenance of economic stability and progress. Prerequisite: FIN 352 (EC 352); EC 340 optional but recommended, senior, graduate standing or approval of area coordinator.

Management (MGT)

Principles of Management 3 hrs.
Elements of the managerial process fundamental to successful operation of various types of enterprises.

Public Policy Toward Business 3 hrs.
Prerequisite: junior standing. (Same as EC 322).

Organizational Behavior 3 hrs.
Behavioral-science and social-systems approach to behavior of people at work in organizations. Behavioral decision-making, organizational theory, communication process, work motivation, groups, leadership, organizational climate, organizational development and other aspects of human behavior in organizations. Prerequisite: MGT 301.
Management and Labor Relations 3 hrs.
Psychological and institutional factors as well as economic analysis of major aspects of such problems as employment, wages, hours, unionism, labor-management relations, and social security. Prerequisite: MGT 301.

Theories and practices related to personnel functions such as recruitment, selection, orientation and placement, training, evaluation, promotion, and compensation. Recent research in human resource management; valuable to students majoring in other areas related to these functions. Prerequisite: MGT 301.

Small Business Management 3 hrs.
Application of principles and practices of modern management start-up operation and control of small business firms. Role of small businesses in the economy. Opportunities and operational problems of small firms. Prerequisite: MGT 301 and senior standing.

Information Systems Design & Implementation 3 hrs.
Management aspects of establishing, maintaining, and using information systems, primarily computer systems, in organization. Technical and human aspects of information systems. Lab fee: Level 3. Prerequisites: MGT 301, MSC 385, MIS 201 (same as MIS 412).

Business Policy 3 hrs.
Integration of principles and methods acquired in the core curriculum of business strategy, policy, and management action. Analyses of comprehensive business cases; opportunity to acquire and develop skills in diagnosing and solving complex business problems. Prerequisite: senior standing, completion of all core courses and 50% of major option courses.

Business and Society 3 hrs.
Power influence in American business. Problems that have developed historically and difficulties in today's business environment. Their avoidance by proper recognition of responsibilities. Prerequisite: MGT 301, MKT 301 and senior standing. (Same as MKT 430).

Honors: Small Business Counseling 3 hrs.
Practical exposure to problems and opportunities of small business firms. Assignment of student teams as counseling unit to assist local business managers with identification of problems and formulation of alternative solutions, as well as identification of areas of opportunity within the organization. A selection of students with demonstrated ability to understand and apply knowledge from several disciplines to day-to-day operations of business enterprise. Prerequisite: approval of SBI director.

Special Projects 3 hrs.
Active involvement in an on-going project in a business enterprise that has particular interest and relevance to the student or an in-depth investigation of contemporary management problems. Prerequisites: senior standing and approval of the area coordinator.

International Management 3 hrs.
Management of the multinational business enterprise in interaction with its political, economic, social, cultural, and legal environments. Prerequisite: senior, graduate standing or approval of area coordinator.

Seminar in Management 3 hrs.
Selected topics in management. Prerequisite: senior or graduate standing or approval of area coordinator.

Management Information Systems (MIS)

Introduction to Computers and Information 3 hrs.
Data and information processing in organizations and other computer uses in management. Management of the computer as a resource. Impact of computers on the individual and society, including security, privacy, and control. Programming in the BASIC language and the use of computer terminals. Applications and examples will generally be from administrative areas. Lab fee: Level 3. Prerequisites: MA 121 or MA 143 or Level III placement. (Same as CS 201).

307 Accounting Information Systems 3 hrs.
Design, operation, analysis of accounting information systems with respect to data input, processing, storage, recall, security, internal control, and the audit trail. Emphasis will be placed on computerized systems. Lab fee: Level 3. Prerequisites: MIS 201, AC 212. (Same as AC 307).

311 Computer Applications in Economics and Business I 3 hrs.
Business systems and data processing procedures; impact of data processing methods on the economic structure of business. User communication, file design, report control, documentation. Data bases, information collection, planning and control, systems design concepts including COBOL. Lab fee: Level 3. Prerequisites: CS 208. Not open to students who have had CS 211 or CS 310. (Same as EC 311 or CS 311.)

411 Computer Applications in Economics and Business II 3 hrs.
Techniques in economic business modeling, case studies of business applications and computer simulation of business operations. Projects requiring independent research. Lab fee: Level 3. Prerequisite: MIS 311. (Same as CS 411 or EC 411.)

412 Information Systems Design & Implementation 3 hrs.
Management aspects of establishing, maintaining, and using information systems, primarily computer systems, in organizations. Technical and human aspects of information systems. Lab fee: Level 3. Prerequisites: MGT 301, MSC 385, MIS 201

490 Special Projects 3 hrs.
Active involvement in an on-going project in a business enterprise that has particular interest and relevance to the student of an in-depth investigation of contemporary management information systems problems. Prerequisite: senior standing and approval of area coordinator.

Management Science (MSC)

287 Statistical Analysis 3 hrs.
Collection, classification, and presentation of data, measures of central tendency, and dispersion, introduction to probability distribution and sampling theory, confidence limits and test of significance, chi-squared and "t" distribution. Prerequisite: Level 3 math placement, MA 143, or MA 121 or equivalent.

325 Intermediate Economic and Business Statistics 3 hrs.
Probability and probability distributions, sampling theory and statistical inference, analysis of variance, linear regression and correlation, analysis of time series, and index numbers and their construction. Prerequisite: junior standing. Lab fee: Level 2. (Same as EC 325).

385 Production/Operations Management 3 hrs.
Management of Production operations function in business organizations. Production systems design considerations, productions planning, production control, inventory control, quality control, and maintenance. Applicable quantitative methods. Lab fee: Level 2. Prerequisites: MGT 301 and MSC 287

490 Special Projects 3 hrs.
Active involvement in an on-going project in a business enterprise that has particular interest and relevance to the student or an in-depth investigation of contemporary management science problems. Prerequisite: senior standing and approval of area coordinator.
Marketing (MKT)

301 Principles of Marketing 3 hrs.
Integration and study of functional, commodity, and institutional approaches from viewpoint of consumer and marketing manager. Prerequisite: junior standing or approval of department.

332 Consumer Behavior 3 hrs.
Interdisciplinary approach to analyze and interpret consumer buying habits and motives and the resultant purchases of goods and services. Purchaser's psychological, economic, and sociocultural actions and reactions as they relate to better understanding of consumption. Prerequisite: MKT 301.

342 Promotional Strategy 3 hrs.
Promotional techniques available to marketing management. Consumer behavior and communication process means by which products can be effectively promoted. Specific tools of personal selling, advertising, sales promotion, and publicity as components of overall promotional strategy. Prerequisite: MKT 301.

343 Marketing Research 3 hrs.
Research function as it fits into marketing operations. Techniques and information sources available to marketing researcher, to concept of marketing information system, and to role of marketing research in such systems. Prerequisite: MKT 301, MSC 287.

345 Market Channel Structure and Strategy 3 hrs.
Marketing channels as a functional area and the alternative choices available to marketing management in developing overall marketing strategy. Institutional structures and dynamic interrelationships in distribution logistics. Prerequisite: MKT 301.

410 Marketing Management 3 hrs.
Management of marketing function of the firm: determination of objectives, organization and controls for effective utilization of marketing resources in coordinated effort with other major functional areas. Identification and selection of market opportunities. Competitive strategies and development of marketing policies and programs. Prerequisite: senior standing and 15 hours in marketing.

414 Industrial Marketing 3 hrs.
Complex and highly competitive market for industrial goods. Understanding of the size and professional nature of this market, its problems and its solutions. Prerequisite: MKT 301 and senior standing.

415 Sales Management and Professional Selling 3 hrs.
Integration of techniques and concepts of professional selling with problems of sales management. Objectives and policies for sales managers concerning managing sales force and methods of marketing analysis in terms of sales forecasts and budgeting. Problems faced by sales management in competition, pricing, and promotion. Prerequisite: MKT 301 and senior standing.

416 Retailing Policy and Management 3 hrs.
Policies, practices, and problem solutions in efficient operation of chain and independent retail stores. Store location, organizational layout, merchandise planning and control, buying, pricing, and promotion. Prerequisite: MKT 301 and senior standing.

430 Business and Society 3 hrs.
Power influence in American business. Problems that have developed historically, difficulties present in today's business environment. Their avoidance by proper recognition of responsibilities. Prerequisite: MKT 301, MGT 301 and senior standing. (Same as MGT 430).
490 Special Projects 3 hrs.
Active involvement in an on-going project in a business enterprise that has particular interest and relevance to the student or an in-depth investigation of contemporary marketing problems. Prerequisite: senior standing and approval of the area coordinator.

515 International Marketing 3 hrs.
Procedures and problems associated with establishing and carrying out marketing operations in or with foreign companies. Institutions, principles, and methods involved in solving these business problems. Effect of national differences in business practices and regulation. Prerequisite: senior or graduate standing or approval of area coordinator.

560 Seminar in Marketing 3 hrs.
Review of selected classics in the literature. Recent developments in marketing theory and application to marketing problem solving. Prerequisite: senior or graduate standing or approval of area coordinator.

Procurement (PR)

301 Introduction to Procurement 3 hrs.
Explores the primary aspects of the procurement and management of material resources necessary for government or business operation. Introduction will be made to the broad concepts of procurement and material management to include the generation of a requirement, forecasting, funding, the procurement cycle through award of a contract, inventory control, and distribution. Prerequisite: MSC 385.

302 Contract Administration 3 hrs.
Intensive review of contract administration functions and responsibilities beginning when a contract is awarded and continuing until the contract is terminated or delivery is made and all aspects of the contract have been performed. It includes consideration of the roles of small business and sub-contractors. Prerequisite: PR 301.

303 Cost and Price Analysis 3 hrs.
Presents the tools and techniques available to the student for cost/price estimating, cost/price analysis, projection techniques, factors affecting profit or fee, the weighted guidelines technique of profit analysis and application of the learning curve theory. After cost/price analysis has been performed, negotiation strategies and techniques are developed. Prerequisite: PR 301.

404 Negotiation Techniques 3 hrs.
Develops principles, skills and techniques for effective negotiation of procurement actions. Includes verbal and nonverbal mannerisms, need to communicate, team approach, buyer's preparation for negotiations, and various tactics and strategies for negotiating. Prerequisites: senior standing and PR 303.

405 Government Contract Law 3 hrs.
Application of the legal principles governing government contracts as evolved from common law, statutes, regulations, and court and board decisions. Application of law to each step of the federal procurement and federal assistance process. Prerequisites: senior standing, PR 302, 303 and BLS 211.
Graduate Program in Administrative Science

Purpose

The Master of Administrative Science (MAS) degree is an interdisciplinary generic management program designed to provide entry level and mid-career students with a broad understanding of the operation and administration of public and private organizations. The program provides a thorough grounding in the essential elements of the diverse aspects of the operation of a wide range of organizations with course work in accounting, economics, finance, management, and marketing. Beyond course work in these areas, the program is designed to create and awareness of the legal, social and ethical environment in which public and private management tasks are accomplished. Advanced study in the quantitative and human aspects of organizational problem solving in the high technology environment is emphasized as well as the communication, interpersonal and negotiating skills essential to effective management. This understanding of essential management skills and the operation and influence of complex organizations is enhanced by elective course work.

Requirements for Admission

Applicants seeking admission to the graduate program in administrative science must submit:
- an application to UAH’s School of Graduate Studies;
- two official copies of transcripts of all academic work attempted;
- scores from the Graduate Management Admission Test (GMAT);
- international applicants must also comply with all UAH School of Graduate Studies procedures applicable to them; and
- a supplemental application form obtained from and submitted directly to the Graduate Program Coordinator in Administrative Science.

Classification of Admission

Once an applicant has completed all of the above requirements, the application will be reviewed by the Graduate Academic Standards Committee of the School. Students meeting the following criteria will be admitted unconditionally:

1. a minimum grade point average of 3.0 (4.0 scale);

2. a minimum score of 450 on the GMAT.

3. International applicants must have a minimum of the 50th percentile on each portion of the TOEFL.

Applicants not meeting the above criteria will be considered for conditional admission. Recommendation by the Graduate Academic Standards Committee for conditional admission is based on the applicant’s academic performance, GMAT scores, previous or current work experience, and any addi-
tional information the applicant may wish to submit. Students admitted conditionally must maintain at least a "B" average for the first 12 hours of graduate work, and meet any other conditions established by the School’s Programs Coordinator.

All recommendations for admission must be approved by the Dean of the School of Administrative Science and the Dean of Graduate Studies.

Applicants who wish to begin graduate study before receipt of all application material may do so as graduate non-degree students provided they have:

- an application to graduate school on file;
- completed the supplementary application form; and
- have either

1. transcripts of all undergraduate degree work on file with a minimum "B" undergraduate grade point average, or

2. provided proof of a bachelor’s degree and submitted a test score of at least 450 on the GMAT.

3. International applicants must also submit test scores from the TOEFL with a minimum of 50th percentile on each portion.

Graduate non-degree students must be approved by the School’s Programs Coordinator and the Dean of the School of Graduate Studies. (See Graduate School section.)

Advisement and Registration Procedure

All students are required to submit a Program of Study before he or she has completed 12 hours of work. Advisement of graduate MAS students is coordinated by the School’s Programs Coordinator in conjunction with members of the graduate faculty. All student registration cards must be approved by the School’s Programs Coordinator.

Course Load

The normal course load for a full-time graduate student is six to nine semester hours per term. Students who are employed full time must obtain permission of the School’s Programs Coordinator or adviser to enroll for more than three semester hours per term.

Course Numbers

All courses numbered 600 and above are reserved exclusively for graduate students. Students must receive permission of the School’s Programs Coordinator to receive graduate credit for courses at the 500 level. At least three hours of electives must be completed at the 600 or higher level. No graduate credit will be given for courses numbered below 500.
Degree Requirements

In addition to meeting all degree requirements established by the School of Graduate Studies, all candidates for the Master of Administrative Science degree must meet the following conditions to be eligible for graduation:

1. Completion of the foundation of administrative science curriculum by undergraduate or graduate work,

2. Completion of a minimum of 36 hours of graduate level course work including the administrative science core curriculum, 15 hours of electives (the option) and the strategic management requirement (AS 637 Organizational Policy),

3. Successfully complete the comprehensive examination requirement, and

4. Maintain a minimum “B” average for all degree credit course work.

The Curriculum

The MAS curriculum is structured to provide students with the opportunity to do advanced work in management regardless of undergraduate background. The MAS degree program consists of 57 semester hours of which up to 21 semester hours may be waived on the basis of appropriate undergraduate course preparation. The minimum number of degree hours is 36.

The degree program has the following structure:

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Foundation of Administrative Science Curriculum*</td>
</tr>
<tr>
<td>2. Administrative Science Core Curriculum*</td>
</tr>
<tr>
<td>3. Option</td>
</tr>
<tr>
<td>4. Strategic Management Requirement</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

*Up to 21 hours of the foundation of administrative science curriculum may be waived on the basis of appropriate undergraduate course preparation.

Foundation of Administrative Science Curriculum (21 semester hours)

The foundation curriculum is designed to provide students with the necessary background to enter the AS core curriculum, options and AS 637 Organizational Policy. Students who have completed equivalent course work at an AACSB accredited undergraduate institution may, with the permission of the School’s Programs Coordinator, waive up to 21 semester hours of the foundation course work. The foundation courses are:

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS 621 Introduction to Administrative Science</td>
</tr>
<tr>
<td>MIS 609 Introduction to Management Information Systems</td>
</tr>
</tbody>
</table>
Administrative Science Core Curriculum (18 semester hours)

The administrative science core curriculum is designed to provide students with a more comprehensive and deeper understanding of the elements of effective management in public and private organizations. Emphasis is placed on the managerial aspects of economics, accounting, and quantitative methods as well as developing an understanding of complex organizations and the human elements of organizations. The administrative science core consists of the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS 622</td>
<td>Human Behavior in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>AS 623</td>
<td>Organizational Theory</td>
<td>3</td>
</tr>
<tr>
<td>AS 624</td>
<td>Organizational Problems</td>
<td>3</td>
</tr>
<tr>
<td>EC 626</td>
<td>Managerial Economics</td>
<td>3</td>
</tr>
<tr>
<td>AC 670</td>
<td>Managerial Accounting and Finance</td>
<td>3</td>
</tr>
<tr>
<td>MSC 651</td>
<td>Quantitative Methods II</td>
<td>3</td>
</tr>
</tbody>
</table>

(Production/Operations Management)

Administrative Science Options:

Each student in the administrative science program must complete a minimum of 15 hours in electives of which at least three hours must be at the 600 or higher level. The options are established to provide the student with a variety of choices in meeting individual career needs. In addition to the options listed below, a student may tailor an option by selecting from graduate-level courses offered in various departments. All tailored options must be approved by the School’s Programs Coordinator. Additional information concerning the courses taught outside the School of Administrative Science may be obtained from the respective heads of the departments. Course descriptions for option courses are listed in the graduate course offering section for the School of Administrative Science are in the respective departmental sections of the catalog.

Computer Science Option

Electives: Students taking this option should consult the department chairman before selecting electives.
Economics Option

Required: EC 600 and EC 610
Electives: EC 546, EC 564, EC 585, EC 620, EC 630, and EC 640

Educational Administration Option

This option leads to the Class A Professional Teaching Certificate. A prerequisite to the Class A certificate is eligibility for a Class B certificate. Students pursuing this option are required to complete the core curriculum, with the exception of EC 626 and an additional 18 semester hours in education electives. Students selecting the educational administrative option should consult the chairman of the Education Department for a listing of the required and elective courses.

Human Resource Management Option

Required: AS 629 and SOC 630
Electives may also be chosen from other School of Administrative Science graduate course offerings.

Industrial and Systems Engineering Option

Required: EG 626 and EG 627
Electives: EG 523, EG 526, EG 621, EG 632, EG 633, EG 634

Operations Research Option

Required: EG 626 and EG 636
Electives: EG 527, EG 621, EG 629, EG 634, EG 635, EG 737

Project Management Option

Required: AS 629 or SOC 630
Electives: AS 640, AS 641, AS 642, AS 643

Public Administration Option

Required: PSC 650, PSC 652, and PSC 655
Electives: PSC 620, PSC 660, PSC 678, and PSC 695

Strategic Management Requirement

While the entire MAS program is concerned with the development of managers, the strategic management requirement emphasizes the top management perspective. This requirement provides students with a study of ad-
ministrative processes under conditions of uncertainty including integrating analysis and policy determination at the overall management level. AS 637, Organizational Policy, serves as the final integrating course for the analytical application of administrative functions and skills. It develops analytical skills and attitudes of top management in administering the organization as a whole and develops the interrelationships of all problems in the organization. It includes analysis of changing environments, organizational strategy development, strategic goal setting, organizational policy formulation, and management problem analysis.

Other Policies

Refer to the Graduate School section in the catalog for policies concerning probation and dismissal, academic standards, examinations, appeals procedure, graduation requirements, transfer of credits, residency requirement, time limit, and financial assistance.

Graduate Course Offerings

Accounting (AC)

601 Introduction to Accounting and Finance 3 hrs.
Fundamentals of financial accounting and corporate financial management. Preparation for higher-level administrative science courses for students who have not had courses in accounting and business finance. Prerequisites: graduate standing.

670 Managerial Accounting and Finance 3 hrs.
A study of accounting information as a management decision-making tool: financial analysis and interpretation of accounting data and internal reports. Prerequisites: graduate standing; AC 601 or equivalent.

Administrative Science (AS)

615 The Social, Legal and Ethical Environment of Organizations 3 hrs.
This course explores the external environment in which public and private organizations exist. Emphasis is given to the influence of legal and political forces on organizations in the operational and decision making processes. Prerequisites: graduate standing.

621 Introduction to Administrative Science 3 hrs.
Principles of organizational structure, planning and forecasting, directing, controlling, staffing, decision-making, communication, and their relation to one another. Preparation for higher-level administrative science courses.

622 Human Behavior in Organization 3 hrs.
Organization as a continuing social system. Problems of motivation and incentives, organizational communication, and their blockages. Selection, training, promotion, and severance of organizational members. Prerequisite: AS 621.

623 Organizational Theory 3 hrs.
Theories of organizations and their structures. Organizations from the perspectives of management, psychology, sociology, political science, and economics. Organizations as groups of people and as systems in multiple environments. Goals, resources, effectiveness, equilibrium, and change relating to organizations. Administration's relationships with organization with emphasis on research and assessment. Prerequisite: AS 621.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>624</td>
<td>Organizational Problems</td>
<td>3 hrs.</td>
<td>Organizational and group interface problems and processes and principles bearing on their solutions by simulations, case analysis, and structured interactions. Prerequisites: AS 621 and AS 622.</td>
</tr>
<tr>
<td>625</td>
<td>Labor Relations and the External Environment</td>
<td>3 hrs.</td>
<td>Relationships between management and organized labor and between organizations and the world outside their confines. Development of organized labor in the U.S. and major legislation-affective relations between management and labor. Collective bargaining process and administration of the resulting contract from the standpoints of management and labor. Effects of the social, economic, political, and technological environments of labor relations and on the organization's relations with the external environment. The public and news-media impact upon management actions.</td>
</tr>
<tr>
<td>629</td>
<td>Leadership and Motivation</td>
<td>3 hrs.</td>
<td>Authority and leadership styles and their effectiveness in different types and levels of organization. Theories of personnel motivation and their practicability and effectiveness. The critical role of effective communication in leadership and motivation. Prerequisite: AS 622.</td>
</tr>
<tr>
<td>631</td>
<td>Personnel Administration in Organizations</td>
<td>3 hrs.</td>
<td>Traditional and contemporary theories of purposes, functions, and processes of personnel administration needs of large complex organizations in both the private and public sector. Elements of a comprehensive personnel program in relation to the total management.</td>
</tr>
<tr>
<td>632</td>
<td>Civil Systems Planning</td>
<td>3 hrs.</td>
<td>Values and dangers inherent in current planning methods and predictive models. Application of specific techniques and planning situations for solving social problems through integration of purely technical information with that of economics, sociology, psychology, and political science. Classroom work and laboratory visits to community agencies.</td>
</tr>
<tr>
<td>633</td>
<td>Socio-Economic Consequences of Government Procurement</td>
<td>3 hrs.</td>
<td>The nature of federal government procurement, contracting. Government's organization and procedures for managing the contractual system and its impact upon participating private industry. Implication of the contractual system on the political, economic, and social system-individual states, small business, minority groups, and labor employment areas.</td>
</tr>
<tr>
<td>634</td>
<td>Seminar in Administrative Science</td>
<td>3 hrs.</td>
<td>Social and behavioral concepts applicable to leadership, motivation, morale, decision-making, and communication. Student's individual research projects based on their own investigation. Integration and application of acquired knowledge. Prerequisite: administrative science majors with 27 credit hours toward the degree including 15 credit hours of core courses.</td>
</tr>
<tr>
<td>635</td>
<td>Administrative Science Internship</td>
<td>1-3 hrs.</td>
<td>Management internships will provide the opportunity to observe and participate in local industries and organizations. Students will be required to keep a log of activities and submit a final report. Prerequisite: minimum of 12 hours completed in AS Program.</td>
</tr>
<tr>
<td>637</td>
<td>Organizational Policy</td>
<td>3 hrs.</td>
<td>A study of administrative processes under conditions of uncertainty including integrating analysis and policy determination at the overall management level. Prerequisites: completion of all Administrative Science core courses.</td>
</tr>
</tbody>
</table>
640 Principles of Project Management 3 hrs.
The conceptual foundation and organization of project management. The project life cycle, planning, control, and financial management.

641 Applied Project Management 3 hrs.
Continuation of material developed in AS 640. Project management as a career field, project initiation, and the project plan. Insight into the intricacies of organizing for project management. Techniques for controlling the three major parameters of project performance and consideration of substantive aspects of interpersonal management.

642 Quantitative Applications in Project Management 3 hrs.
For technical and nontechnical students, many of the quantitative techniques used in contemporary project management. Systems, cost, and consequence analyses and schedule methodology, as well as the critical topic of system integration.

643 Simulation of Project Management 3 hrs.
Federal and industrial decision-making, student participation in a simulation exercise involving a critical review point in the project life cycle, and current issues in project management.

650 Selected Research Topics 3 hrs.
Research in a particular topic relevant to administrative science by one student or a group of students. The research paper must be an original contribution showing a research design and results that meet the highest standards of social science research. Prerequisite: completion of 15 hours of student's curriculum and approval of the Dean of the School of Administrative Science.

Economics (EC)

600 Theory of Income and Employment 3 hrs.
Continuation of EC 340. More advanced treatment of theory of national income determination and associated concepts. Prerequisite: EC 340 or equivalent. EC 510 and the approval of the instructor for noneconomic majors.

607 Survey of Economic Theory 3 hrs.
Rigorous treatment of basic principles underlying economic theory. Theory of national income determination, theory of market structures, principles of value and distribution theory. Prerequisites: approval of instructor and graduate standing.

610 Theory of Value and Distribution 3 hrs.
Continuation of EC 345. Consideration of classical and neoclassical theory of value and distribution. Prerequisite: EC 345 or equivalent. EC 510 and approval of instructor for the noneconomic majors.

620 Econometrics 3 hrs.
Least-square estimation of single-equation linear models, properties of the estimators, significance tests and confidence intervals of estimation, and problems in estimation of single-equation models (autocorrelation, multicollinearity, heteroscedasticity). Prerequisites: EC 430, EC 510, and approval of the instructor for noneconomic majors.

626 Managerial Economics 3 hrs.
Analysis of economic problems of organizations and decision making techniques to solve these problems. Formal analysis of demand, supply functions, techniques used in demand analysis. Analysis of theory of cost, production, and cost estimation. Analysis of price, output and investment decisions including theory of optimal behavior, alternative price strategies, time value of money and project selection. Lab fee: Level 2. Prerequisites: EC 607 or equivalent.
630 Evolution of Economic Thought 3 hrs.
Methodology and social philosophy of outstanding economists and their part in shaping economic development. Selective treatment emphasizing systematic nature of theories involved. Prerequisite: EC 448, 600, 610, or equivalent.

640 Seminar in Economics 3 hrs.
Intensive analysis of selected theoretical and applied aspects of economics. Prerequisites: EC 510 and approval of the instructor for noneconomic majors.

700 Research in Economics 3 hrs.
Special topics in area of student interest. Prerequisite: EC 630.

Finance (FIN)

602 Investments 3 hrs.
Overall view of the investment-decision process, study of portfolio construction and management utilizing quantitative analysis. Prerequisite: AC 601 or equivalent.

603 Business Finance Problems and Policy 3 hrs.
Corporate financial policy and decision making. Working capital management, capital budgeting, risk-return analysis, valuation, and dividend policy; social aspects of mergers, acquisitions and reorganizations. Prerequisite: AC 601 or equivalent.

Management Information Systems (MIS)

609 Introduction to Management Information Systems 3 hrs.
Examines the role management information systems play in organizations including design, planning for, implementation and use of the management information systems. Applications and examples will be from administrative science areas. Open only to MAS students without background in computer usage and information systems. Prerequisite: graduate standing.

Management Sciences (MSC)

608 Quantitative Methods I 3 hrs.
Administrative applications of quantitative methods including sampling, linear regression and correlation time series analysis, queing, simulation, linear programming. Prerequisites: MSC 287 or equivalent and MIS 609 or equivalent.

651 Quantitative Methods II 3 hrs.
Study of organizational production and operation problems and techniques applied in solving them. Capacity planning, location and distribution demand forecasting, inventory control, maintaining system reliability, process and job design. Prerequisite: MSC 608.

Marketing (MKT)

606 Marketing Administration 3 hrs.
Development of analytical concepts and principles to design efficient strategies for solving marketing problems; major policy areas of product, price, channels, and promotion integrated in development of the firm's total marketing effort; includes application for non-profit organizations. (Not open to students who have taken MKT 301.) Prerequisite: graduate standing.
The arts, humanities, and social sciences contribute substantially to the understanding of man's relation to himself, to his fellowman, and to the physical and biological world in which he lives.

The arts and the humanities, encompassing art, history, language and literature, music, and philosophy, lead to an understanding and appreciation of life as man has perceived it and as he has lived it. Their study leads to a heightened critical faculty and a greater ability to manipulate and evaluate ideas, to a more effective use of language, and to a cultivation of taste. The study of the arts and the humanities is essential to a broad and sensitive awareness of man as he has been, is, and aspires to be.

The social sciences encompass the knowledge that deals with the behavior of man and the culture he has created, knowledge that becomes more necessary as the world grows more complex. Social scientists perform a dual function, assembling complex masses of technical knowledge and attempting continual appraisal of the value systems in our society. The social sciences at UAH, comprising political science, psychology, and sociology, are designed to perform both roles. Since these disciplines are concerned with a social milieu that is both possible and desirable, the approach is scientific in terms of assumptions and methods, but humanistic in its implications.

**Undergraduate Degrees and Study**

The School of Arts, Humanities, and Social Sciences awards a Bachelor of Arts degree. Each student must declare an area of concentration (AOC) no later than the close of his sophomore year. This AOC must include a major and a minor or supporting cognate studies. The major must be chosen from one of the following disciplines: art, criminal justice, education, English, French, German, history, music, political science, psychology, or sociology. Besides these majors, courses are offered in American Studies, communication, linguistics, philosophy, physical education, Russian, and Spanish.

The supporting studies must include one of the following variations:

1. An established minor drawn from a department offering a major at UAH. The minor must include 21 semester hours or more as prescribed by the
department, at least 6 of which must be numbered 300 or above. (Students planning a minor in music, see Music department section.)

2. A minor drawn from a discipline without an established major, including 21 semester hours of courses of which at least 6 hours numbered 300 or above.

3. A group of courses designated cognate studies, supporting the major and drawn from two or more disciplines with a minimum of 21 semester hours, 9 of which must be taken in courses numbered 300 or above.

Any minor chosen by a student is subject to approval of the chairman of the department offering the minor. Any area of cognate studies chosen by a student is subject to approval of the chairman of the student’s major department. All AOC’s are subject to approval by the dean of the school. Each major department has developed appropriate areas of concentration to provide a sound curriculum of various areas of interest. A student who wishes to deviate from any of the standard AOC’s, however, may work out an individual program with advice from his major department.

A student may pursue a composite major with emphasis in these areas: Slavic studies, human growth and development, and foreign language and international trade. These programs involve combinations of disciplines within the School of Arts, Humanities, and Social Sciences and in cooperation with other schools in the university.

Graduate Programs
The School of Arts, Humanities, and Social Sciences offers Master of Arts degrees in English and history and an interdisciplinary graduate degree, the Master of Arts in developmental learning. The school also offers options within the Graduate Program in Administrative Science in the areas of education administration and public administration.

Arts, Humanities, and Social Sciences (AHS)

100 The Art of Being Human 3 hrs.
A humanistic approach to such important ideas as art, music, religion, love, and death, and their relevance to self-fulfillment and the good life.

300 Statistical Analysis 3 hrs.
Collection, classification, and presentation of social science data, measures of central tendency and dispersion, introduction to probability distribution and sampling theory, confidence limits and tests of significance, chi-square and “t” distribution. Prerequisite: MA 105.

392 Engineering Ethics and Professional Behavior 3 hrs.
Examination of ethical aspects of decisions made by engineers, including consideration both of the kinds of professional and organizational situations confronting the engineer and philosophic bases of choosing and evaluating. Examination of broader values and responsibilities of the engineer as a professional person. Prerequisite: junior standing.

Special Services (SS)

001 University Study Skills 0 hrs.
Study and test taking skills necessary for success in college. Prerequisite: Special Services admission.
Reading Comprehension Level I
0 hrs.
Reading skills necessary for success in college. Prerequisite: Special Services admission. Test scores at or below ninth grade level.

Reading Comprehension Level II
0 hrs.
Reading skills necessary for success in college. Prerequisite: Special Services admission. Test scores at or above ninth grade level, and below twelfth grade level.

American Studies Program

The minor in American studies is an interdisciplinary program designed to acquaint students with important features of American culture and civilization. Stressing a multifaceted approach, American studies develops analytic skills applicable to a wide range of cultural situations, past and present. The program also encourages students to combine personal and scholarly interests in a coherent group of courses chosen with the help of an adviser. Drawing upon materials and theory from economics, sociology, and political science to elucidate aspects of American culture and using literary materials to capture sense and feeling as well as facts, the student learns to view human problems in the context of a national culture.

All American studies minors must be drawn up in consultation with a member of the American Studies Committee. They will be countersigned by the program director as well as the adviser in the major field. Plans should be made as early as possible in the student’s career so that the problems encountered with prerequisites in interdisciplinary work can be anticipated and avoided.

The minor consists of at least 21 hours. Three courses (9 hours) must be upper-level. All students must take American Studies 201, American Studies 401, and one course each in American history and literature. Exceptions to these requirements are subject to approval by the American Studies Committee. No course may appear in both the major and the American studies minor on the student’s AOC form. AMS 201 is an introduction to concepts of the program and should be taken at the beginning of the minor. AMS 401 is a senior seminar designed to draw together the themes of the interdisciplinary work in group discussion and is part of the senior year’s work.

Each minor program developed by a student and faculty adviser will reflect a core theme or interest area of the student. Programs can be planned by drawing from the variety of courses in the catalog concerning aspects of American civilization. Advisers can provide students with a summary list of such courses and can discuss model programs that illustrate ways in which appropriate minors can be designed. To cite only two among many possible cluster patterns, a student interested in an American studies minor with focus on the culture and civilization of the South may consider combining AMS 201, EH 331, HY 221 or 222, AMS 401, and three electives chosen among such courses as SOC 333, EH 432 or 433, HY 370 or 414, and PSC 223. A student interested in twentieth-century American civilization and culture may include AMS 201, EH 331, HY 222, AMS 401, and three electives chosen among EH 420, 421, 431, or 339, ARH 304, HY 370 or 438, PSC 323, 318, or 307, and EC 341.
### American Studies (AMS)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>201</td>
<td>Introduction to American Studies</td>
<td>3 hrs.</td>
<td>Concepts and methods involved in the interdisciplinary study of American culture through analysis of a central theme in the American experience. Spring term; requirement for all minors. Prerequisite: sophomore standing.</td>
</tr>
<tr>
<td>301</td>
<td>Special Topics in American Studies</td>
<td>3 hrs.</td>
<td>Elective offering by members of constituent departments in American Studies and approved by the American Studies Committee. Focus of each course upon a specific period or topic and its meaning and significance in an interdisciplinary framework. Prerequisite: AMS 201 or permission of instructor.</td>
</tr>
<tr>
<td>401</td>
<td>Seminar in American Studies</td>
<td>3 hrs.</td>
<td>Seminar. Themes studied in the minor, subject matter to vary depending upon interests and program of students in each year's class. Prerequisite: senior standing and a minor in American studies.</td>
</tr>
</tbody>
</table>
Department of Art and Art History

Professor Bayer (chairman); Associate Professors Dempsey, Pope; Assistant Professors Crouse; Adjunct Assistant Professors Mikell, Milberger, Parrish.

The Department of Art and Art History is an institutional member of the College Art Association and the Southeastern College Art Conference. The UAH chapter of Kappa Pi, international art honorary fraternity, is Epsilon Tau. The student art club is FOCAL.

The art program is planned to provide the necessary background for graduate work in art, a professional career in art, and cultural enrichment. To enable UAH visual art graduates to compete with graduates from institutions offering the Bachelor of Fine Arts degree, the art program provides both depth and breadth in studio course offerings.

Although an individual student will profit from previous art experience or aptitude, this is not a requirement for admission to many of the 100-level art courses, and should not be considered a critical factor for success in those courses.

All of the studio courses require supplies to be secured by the student along with a lab fee. Students who have funded support should include an amount for supplies and fees in their request. Since some studio courses do not require textbooks, the overall cost to the student is reduced to this extent.

An art student transferring to UAH from another institution must submit information on previous training and representative samples of his art work to the art faculty for evaluation before registration. Advanced placement in art courses will be determined by the Art faculty. Transfer candidates for a degree with a specialty in art must take at least 12 semester hours of art courses numbered 300 or above at UAH. A student having a minor in art must take at least 6 semester hours at UAH.

Selected examples of student art work may be retained for inclusion in the permanent collection of the UAH Gallery of Art.

The art curriculum is multifaceted providing the possibility of teacher certification and a variety of programs leading to a baccalaureate degree. The department also offers courses intended either as introductory or skill-enhancing experiences in the art discipline. The Bachelor of Arts degree requires specialization in either art history or the studio arts. Art history examines the changing art styles of the various epochs of western civilization and the relationship of these art forms to personal and cultural world views. The studio curriculum includes a core program followed by two years of upper division work offering either breadth and/or depth in the following concentrations: advanced design, communication graphics, drawing, interior design, painting, photography/film, printmaking, and sculpture.

The communication graphics concentration consists of courses in advertising layout, typographic and lettering design, and commercial art processes. A free informative booklet, "Careers in Communication Graphics," is available on request from the Department of Art and Art History. The interior design
concentration is intended for persons preparing for work in this profession. The curriculum includes basic design, design analysis, residential and commercial space planning. Technical development includes the basic knowledge of architectural structural planning, building equipment and components, textiles, specifications; professional boards and ethics.

Students majoring in other departments are encouraged to consider various level art courses as electives. Development of one’s human faculties and understanding through art is universally recognized. Although all art courses are open to any UAH student, ARH 109 and ARS 110 have been especially conceived for the non-art major.

Area of Concentration (AOC) with Art Major

Four basic patterns have been established for the degree candidate in art: the first three are designed to be most helpful to the greatest number of students; the fourth program is designed for students of exceptional ability.

1. Studio Specialty

The program consists of a lower-division foundation core curriculum of ten courses which is designed to provide the basic vocabulary and syntax of the visual art language. The upper-division format composed of eight courses offers the student the option of selecting a program of broad studio experiences or specializing within a discipline. It is strongly advised that no more than two studio courses be taken in any one term.

Freshman-Sophomore — Core Art Requirements
(30 semester hours or 24 semester hours when art history 100 or 101 are included in the cluster or minor.)

A. BASIC DESIGN — Both courses required
   ARS 120 — 2-Dimensional Form in design. ......................... 3 hrs.
   ARS 121 — Color in Design. .................................... 3 hrs.

B. SCULPTURE — Both courses required
   ARS 140 — Organic Materials. ................................... 3 hrs.
   *ARS 141 — Metal Assemblage. ............................. 3 hrs.

C. PHOTOGRAPHY — One course required
   *ARS 150 — Photography. ........................................ 3 hrs.

D. DRAWING — ARS 160 — Dark on Light and one of the following
   *ARS 161 — Fluid Media. .................................... 3 hrs.
   *ARS 162 — Light on Dark. .................................. 3 hrs.
   *ARS 163 — Collage. ......................................... 3 hrs.
   *ARS 167 — Drawing and Rendering. ....................... 3 hrs.
E. PRINTMAKING — One course required
*ARS 180 — Introduction to Printmaking. ......................... 3 hrs.

F. ART HISTORY — Both courses required
ARH 100 — Art History Survey:
  Ancient to Modern. ........................................... 3 hrs.
ARH 101 — Art History: Armory Show (1913) to the Present. ......... 3 hrs.

There are no prerequisites for ARH 100 and 101, ARS 120, 121, 140 and 160 which introduce the student to the most basic concepts and skills regarding the visual arts.

The courses marked by an asterisk should be taken only after the successful completion of any two of the above mentioned courses.

Students planning to specialize at the junior-senior level in the interior design concentration are required to complete ARS 167.

Junior Level
(15 semester hours)

Five courses are required at the 300-level with no more than three courses to be taken in any one studio concentration. A student may elect to specialize in one concentration by taking three courses in that area.

Interior Design — ARS 310, ARS 311 and ARS 312
Advanced Design — ARS 320, ARS 321 and ARS 322
Communication Graphics — ARS 330, ARS 331 and ARS 332
Sculpture — ARS 340, ARS 341, ARS 342, ARS 343 and ARS 344
Photography/Film — ARS 350, ARS 351 and ARS 352
Drawing — ARS 360, ARS 361 and ARS 362
Painting — ARS 373, ARS 375, ARS 376 and ARS 377
Printmaking — ARS 380, ARS 381, ARS 382, ARS 383 and ARS 387
Other — ARS 390

Senior Level
(9 semester hours)

Senior level courses are to be taken only after the successful completion of a minimum of three 300-level studio courses or proper prerequisites. No other studio courses should be taken while completing senior requirements.

Students electing to specialize in communication graphics must complete ARS 430, 431 and 432 which may be taken in any sequence.

Interior design specialists must complete ARS 410, 411 and 412 in numerical sequence.

All other studio students must complete ARS 400, 401, and 402 which may be taken in any sequence.
Total Number of Hours:
48 semester hours when ARH 100 and 101 are included in the minor or cognate studies.

Minor or Cognate Studies for the Studio Specialist
An art history minor or cognate studies including art history courses is strongly recommended for the studio specialist. Either of these programs must be approved in consultation with the departmental adviser. ARH 309 is required for those students electing to specialize in the interior design concentration.

Minor in Art History for the Studio Specialist
(21 semester hours)
ARH 100 — Art History Survey: Ancient to Modern
ARH 101 — Art History: Armory Show (1913) to the Present
Five courses in art history at the 300 level or above are required. These are to be chosen in consultation with department adviser.

Cognate Studies Including Art History for the Studio Specialist
(21 semester hours)
ARH 100 — Art History Survey: Ancient to Modern
ARH 101 — Art History: Armory Show (1913) to the Present
A minimum of three (3) art history courses at the 300 level or above
ARH 300 — Colonial
ARH 301 — Classical
ARH 302 — Medieval
ARH 303 — Renaissance
ARH 304 — 20th Century
ARH 306 — Baroque and Rococo
ARH 309 — Period Styles
ARH 310 — 19th Century/Europe
ARH 400 — Renaissance Seminar
ARH 401 — Modern Seminar
ARH 402 — American Seminar
ARH 403 — Post 1945 Seminar
ARH 404 — Literature of Art History
ARH 405 — History of Women Artists
Two courses in related disciplines: Must be approved by department(s) concerned.

2. Art History Specialty
The art history specialty includes introductory courses in studio areas to provide insight into the creative experience.
Lower Division Program (27 semester hours)—During the first year ARH 100 and ARH 101 should be completed. Three courses at the 300 level should
be completed during the second year. During the first two years 12 hours of studio courses (4) should be selected in consultation with the art history adviser. These courses must include ARS 110 and three courses from three different studio concentrations.

Upper Division Program (18 semester hours)—During the junior year three additional art history courses at the 300 level should be completed. Three courses in art history at the 400 level or above should be completed during the senior year. A 21 hour minor or group of cognate studies is required. All courses for the minor of cognate studies must be taken outside of the Department of Art and Art History.

3. Studio Specialty with Teacher Certification

The program for teacher certification available to art degree candidates offers the qualifications for teaching art in Alabama’s nursery though secondary schools. The general education requirements for certification differ from those of the preceding programs. The student should consult the catalog description for the Department of Education and Developmental Learning for the specifics for the GER, professional courses, and information relevant to the program outlined below.

Required Studio Courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARS 120</td>
<td>Two Dimensional Form in Design</td>
<td>3</td>
</tr>
<tr>
<td>ARS 121</td>
<td>Color in Design</td>
<td>3</td>
</tr>
<tr>
<td>ARS 140</td>
<td>Sculpture: Organic Materials</td>
<td>3</td>
</tr>
<tr>
<td>ARS 141</td>
<td>Sculpture: Metal Assemblage</td>
<td>3</td>
</tr>
<tr>
<td>ARS 160</td>
<td>Drawing: Dark on Light</td>
<td>3</td>
</tr>
<tr>
<td>ARS 161</td>
<td>Drawing with Fluid Media</td>
<td>3</td>
</tr>
<tr>
<td>ARS 180</td>
<td>Introduction to Printmaking</td>
<td>3</td>
</tr>
<tr>
<td>ARS 375</td>
<td>Traditional Oil Painting Techniques</td>
<td>3</td>
</tr>
<tr>
<td>ARS 380</td>
<td>Printmaking: Intaglio</td>
<td>3</td>
</tr>
<tr>
<td>OR</td>
<td>ARS 382 Printmaking: Relief</td>
<td>3</td>
</tr>
<tr>
<td>ARS 383</td>
<td>Screenprinting</td>
<td>3</td>
</tr>
<tr>
<td>Advised electives (choose one)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARS 150</td>
<td>Photography (3 hrs.)</td>
<td></td>
</tr>
<tr>
<td>ARS 351</td>
<td>Photography: Audio-Visual and Film Applications (3 hrs.)</td>
<td></td>
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<tr>
<td>ARS 376</td>
<td>Contemporary Painting Approaches (3 hrs.)</td>
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</tbody>
</table>

(choose one) .................................................................................. 3

ARS 343 Sculpture Workshop (3 hrs.)
ARS 344 Sculpture: Carving (3 hrs.)

Required Art History Courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARH 100</td>
<td>Art History Survey: Ancient to Modern</td>
<td>3</td>
</tr>
<tr>
<td>ARH 101</td>
<td>Art History: Armory Show (1913) to the Present</td>
<td>3</td>
</tr>
</tbody>
</table>
Advised electives (choose three) ........................................... 9
ARH 300 Colonial & 19th Century American Art ......................... 3
ARH 301 Classical ............................................................... 3
ARH 302 Medieval .................................................................. 3
ARH 303 Renaissance ............................................................ 3
ARH 304 20th Century [highly recommended] ............................. 3
ARH 306 Baroque and Rococo .................................................. 3
ARH 310 19th Century .......................................................... 3

Art Program for the Exceptional Student
This program is for individuals who wish to meet the exacting demands of graduate study and for students of exceptional ability and commitment. Students who wish to enter this program must receive the consent of the department chair­man not later than three terms before graduation.

The program requires 6 additional hours beyond requirements for graduation and may be followed in three ways: (a) honors project in studio leading to a solo exhibition during the senior year (ARS 490 and 491); (b) honors project in art history leading to the presentation of a research paper at a seminar meeting during the senior year (ARH 490 and 491); (c) 6 additional semester hours of work in art history scheduled by a studio specialist or 6 additional hours work in studio scheduled by an art history specialist.

Art Minor
A student desiring an art minor may select a program in either studio or art history courses through consultation with an art adviser. The program must total 21 semester hours of which 6 semester hours must be at the 300 level. ARH 109 and ARS 110 are especially recommended for the non-art major seeking cultural enrichment.

UAH Gallery of Art
The UAH Gallery of Art is housed in what was originally the Union Chapel of Hazel Green, Alabama. The building in the Greek Revival Style, originally erected circa 1840 was donated to the university by Mr. and Mrs. Franklin Bendall in 1973. It was relocated to the UAH campus and is situated between Morton Hall and the University Union adjacent to Bicentennial Park. The gallery is operated with the assistance of a student staff.

Exhibitions have included art nouveau glass, nineteenth century photographs, Victorian leaded glass windows, sculpture in a variety of media, prints and paintings, the state juried exhibition, fiber arts, and laser works. A section of the gallery is set aside for exhibition of students’ work. Additional exhibition space is presently under construction in the new Union Building.

UAH Visiting Artist Series
The Department of Art and Art History sponsors campus visits of local, regional, national, and internationally renowned artists, critics, and art historians. Presentations include studio and classroom sessions as well as public lectures.
Visiting sculptors have included: Lyman Kipp, Jason Seley, Kenneth Snelson, Frank Gallo, Duane Hanson, and Kosso Eloul. The laser artist Rockne Krebs and neon sculptor Stephen Antonakos were also participants. Art historians Barry Lewis and Elizabeth Gilmore Holt added depth to these programs as well as critics Donald Kuspit and Suzi Gablik. Among other guests have been the painter, Don Eddy, artist-architects James Wines and Michael McDonough, photographer Rena Small, conceptualist Jeanne-Claude Christo, Dutch printmaker, Joop Vegter, and museum curators Marcia Tucker and Patterson Sims.

The FOCAL Exhibition
The UAH student art organization, FOCAL, in conjunction with the Department of Art and Art History sponsors a biennial regional juried exhibition for college art students of the southeastern states. Cash awards equal $1,000 and the juror or jurors are selected from outside the region. The exhibition is displayed in the UAH Gallery of Art.

Art Studio (ARS)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>110</td>
<td>Art Encounters for the Non-Artist</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>A medley course of workshops, demonstrations, illustrated lectures, field trips, and panel discussions in studio and academic art areas, such as sculpture or painting processes, printmaking, graphic design, and art criticism. Lab fee: Level 2</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>Two-Dimensional Form in Design</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Fundamentals of handling and understanding two-dimensional design. Lab fee: Level 2.</td>
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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>121</td>
<td>Color in Design</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Physiological, psychological, and physical properties of color with experimental studio work in subjective and objective evaluation of color usage. Lab fee: Level 2.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>140</td>
<td>Sculptural Use of Organic Materials</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Introduction in clay to three-dimensional form and space, practice in mold-making and casting techniques, and the use of hydrocals as constructive materials. Lab fee: Level 2.</td>
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</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>141</td>
<td>Sculpture: Metal Assemblage</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Introduction in metals to three dimensional form and space utilizing constructive techniques. Examination of welding technology as a means of creating original works. Lab fee: Level 3. Prerequisites: 2 courses selected from ARS 120, 121, 140, 160 or approval of instructor.</td>
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</tbody>
</table>

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>150</td>
<td>Photography for Drawing and Design</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Understanding and practice of photography through its use as a creative drawing and design medium. It is not necessary to own photographic equipment. Lab fee: Level 2. Prerequisites: 2 courses selected from ARS 120, 121, 140, 160 or approval of instructor.</td>
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</tbody>
</table>

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>160</td>
<td>Drawing with Dark-on-Light Media</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Two-dimensional form and expression through use of traditional means of line, value, texture, composition, perspective, and scale. Lab fee: Level 2.</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>161</td>
<td>Drawing with Fluid Media</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Use of inks, washes, oils, gouache, airbrush, batik, and related media. Lab fee: Level 2. Prerequisites: 2 courses selected from ARS 120, 121, 140, 160 or approval of instructor.</td>
<td></td>
</tr>
</tbody>
</table>
162  **Drawing with Light-on-Dark Media**  
3 hrs.  
Use of light drawing materials (chalks, pastels, oil paints, scratch-board) with emphasis on representation and nonlinear perspective. Recommended as preparation for oil painting. Lab fee: Level 2. Prerequisites: 2 courses selected from ARS 120, 121, 140, 160 or approval of instructor.

163  **Drawing with Collage**  
3 hrs.  
Drawing systems that involve assembling preformed visual materials. Recommended for developing skills in handling color, form, texture, and theory without the necessity of developing manual skills. Lab fee: Level 2. Prerequisites: 2 courses selected from ARS 120, 121, 140, 160 or approval of instructor.

167  **Drawing and Rendering for Illustration**  
3 hrs.  
Drawing techniques for illustration. Expressive and objective drawing styles in professional media. Freehand sketching, perspective studies, rendering techniques, and composition in line, form, value, and color. Required for interior design students and recommended for communication graphics specialties. Lab fee: Level 2. Prerequisites: 2 courses selected from ARS 120, 121, 140, 160 or approval of instructor.

180  **Introduction to Printmaking**  
3 hrs.  
Basic printmaking techniques and processes used for generating ideas and images. Monoprint, collagraph, and nontraditional approaches to printmaking. Lab fee: Level 2. Prerequisites: 2 courses selected from ARS 120, 121, 140, 160 or approval of instructor.

215  **Art for Elementary Teachers**  
3 hrs.  
Art methods and media presented by lecture, demonstration, discussion, reading, and studio experience for elementary school teachers. Lab fee: Level 2.

250  **Intermediate Photography Workshop**  
3 hrs.  
Personal exploration of photography as a fine arts medium with emphasis on production of art works. Course does not satisfy departmental core requirements. Lab fee: Level 2. Prerequisites: ARS 150 preferred but not required.

260  **Intermediate Drawing Workshop**  
3 hrs.  
Synthesis of previous drawing experiences into complete visual statements. Course does not satisfy departmental core requirements. Lab fee: Level 2. Prerequisites: Drawing experience preferred but not required.

270  **Intermediate Painting Workshop**  
3 hrs.  
Studio practice in painting. Development of individual creative expression. Course does not satisfy departmental core requirements. Lab fee: Level 2. Prerequisites: Painting and drawing experience recommended.

**Upper Division**

310  **Introduction to Interior Design**  
3 hrs.  
Basic design terms and styles of furniture. Introduction to design principles; furniture arrangement; elements of color, window treatments, accessories and lighting, consumer buying of furniture and floor and wall coverings. Lab fee: Level 2. Prerequisites: ARH 100 or 101, ARS 120, 121, 160, and 167 or approval of instructor.

311  **Application of Interior Design Principles**  
3 hrs.  
Principles and practices of interior design; activities and space planning; color schemes and theory; interior materials and design of major interior elements. Designing and developing the floor plan or the entire house excluding basic materials and furniture arrangement; exterior design and cost factors. Lab Fee: Level 2. Prerequisites: ARH 100 or 101, ARS 120, 121, 160 and 167 or approval of instructor.
312 Interior Design: Introductory Architectural Planning 3 hrs.
Survey of architectural planning and drawing, primarily as these topics relate to interior decoration. Basic drawing and sketching; planning processes for home and light-commercial buildings; construction materials; elements of construction methods; introduction to preparation of architectural drawings. Lab fee: Level 2. Prerequisites: ARH 100 and 101, ARS 120, 121, 160 and 167 or approval of instructor.

320 Advanced Design: The Art of Stained Glass 3 hrs.
Studio experiences in the practice and examination of stained glass as an art form. Emphasis on original designs carried to completion using such techniques as etching, plating, lead and foil processes to create original, autonomous glass art works. Lab fee: Level 2. Prerequisites: ARH 100 and 101, ARS 120, 121 and 160 or approval of instructor.

321 Design: Advanced Stain Glass 3 hrs.
Creation of original autonomous glass works utilizing the techniques and vocabularies of other related art forms. Examination of painting, printmaking and sculptural approaches and the traditional practices employed in conjunction with the art and craft of stained glass. Experience in tracing, matting, painting, enameling, staining, firing, and etching. Demonstrations in beveling, brilliant cutting and fusing. Lab fee: Level 3. Prerequisites: ARH 100 or 101: ARS 120, 121, 160 and 320 or approval of instructor.

322 Advanced Design: Calligraphy 3 hrs.
Handwriting as an art. An introduction to calligraphy designed for the beginning student. Instruction and practice in the writing styles; tools and techniques of the roman, medieval and renaissance scribe. A concise historical investigation of the design development of the written letter form used in the Western world. Lab fee: Level 2. Prerequisites: ARH 100 or 101; ARS 120, 121 and 160 or approval of instructor.

330 Fundamentals of Advertising Design 3 hrs.
An introduction to the tools, techniques, and practices of the professional artist in the advertising agency. Preparation of art and photography for reproduction in newspaper and magazines. Functional lettering techniques. Lab fee: Level 3. Prerequisites: ARH 100 or 101, ARS 120, 121 and 160 or approval of instructor.

331 Advertising and Typographic Design 3 hrs.
Instruction in the basic skills required of the contemporary graphic designer. Trademark and corporate identity programs. Preparation of full color comprehensives and camera ready art. Lab fee: Level 2. Prerequisites: ARH 100 or 101, ARS 120, 121 and 160 or approval of instructor.

332 Illustration in Black and White 3 hrs.
The design and production of one color art for the print media using gouache ink, ink wash, pencil as well as other commerical drawing materials. Advanced illustrational and rendering techniques. Practical experience in preparing illustrations for publication by offset lithographic reproduction. Lab fee: Level 2. Prerequisites: ARH 100 or 101, ARS 120, 121 and 160 or approval of instructor.

340 Sculptural Use of Thermoset Plastics 3 hrs.
Emphasis on the creation of original work though the sculptural manipulation of thermoset resins and foams. Lab fee: Level 3. Prerequisites: ARH 100 or 101, ARS 120, 121, 140, and 160 or approval of instructor.

341 Sculptural Use of Thermoplastics 3 hrs.
Emphasis on the creation of original work through the manipulation of thermoplastics by bonding, dyeing, forming, and welding. Lab fee: Level 3. Prerequisites: ARH 100 or 101, ARS 120, 121, 140, 160 or approval of instructor.
342 Sculpture: Investment Casting
The lostwax method of producing cast metal sculpture. Creation of sculpture in wax, investment of these waxes in refractory molds, and casting in bronze and aluminum. Prerequisites: ARH 100 or 101, ARS 120, 121, 140, 160 or approval of instructor.

343 Sculpture Workshop
Extension and exploration of techniques of sculpture related to student's previous experience in the sculptural media. Opportunity for additional work in areas of sculpture in which some competence has been developed. Lab fee: Level 2. Prerequisites: ARH 100 or 101, ARS 120, 121 160 or more of the 300-level courses in sculpture and approval of instructor.

344 Sculpture: Carving
Emphasis on the creation of original work through the manipulation of three-dimensional forms by means of subtractive technique using stone and wood. Lab fee: Level 2 Prerequisites: ARH 100 or 101, ARS 120, 121, 140, 160 or approval of instructor.

350 Advanced Photography
Advanced use of black/white and color photography as a fine art. Emphasis on personal expression. Lab fee: Level 2. Prerequisites: ARH 100 or 101, ARS 120, 121, 150 and 160 or approval of instructor.

351 Photography: Audio-Visual and Film Applications
Individual and group production of video, movie and slide dissolve projects. Field trips to professional productions facilities assure familiarity with current developments. Lab fee: Level 3. Prerequisites: ARH 100 or 101, ARS 120, 121, 150 and 160 or approval of instructor.

352 Non-Silver Photography
Investigation and use of alternative processes such as gum-bichromate, xerography and related media to produce works of photographic art. Lab fee: Level 2. Prerequisites: ARH 100 or 101, ARS 120, 121, 150 and 160 or approval of instructor.

360 Advanced Drawing
Drawing with both traditional and contemporary methods and materials encouraging the development of personal expression. Lab fee: Level 2. Prerequisites: ARH 100 or 101, ARS 120, 121 and 160 or approval of instructor.

361 Advanced Drawing with Fluid Media
The development of personal expression through the use of inkwash, air-brush, oil griselle and other related techniques. Lab fee: Level 2. Prerequisites: ARH 100 or 101, ARS 120, 121, and 161, or approval of instructor.

362 Figure Drawing
Drawing from the live model with both traditional and contemporary methods and approaches. Lab fee: Level 3. Prerequisites: ARH 100 or 101, ARS 120, 121 and 160 or approval of instructor.

373 Painting
Painting in various media of individual's choice. Suitable approaches in relation to characteristics of media used. Some previous introductory work in drawing or painting desirable or approval of instructor. Credit not applicable to requirements for major in the painting discipline. Lab fee: Level 2.
375 Traditional Oil Painting Techniques 3 hrs.
Essentially representational painting with techniques ranging from under-painting and glazing to alla-prima oils. Lab fee: Level 2. Prerequisites: ARH 100 or 101, ARS 120, 121 and 160 or approval of instructor.

376 Contemporary Painting Approaches 3 hrs.
Direct personal expression on canvas, through both spontaneous and deliberate handling of acrylic tempera and other painting media. Lab fee: Level 2. Prerequisites: ARH 100 or 101, ARS 120, 121 and 160 or approval of instructor.

377 Painting with Mixed and Non-Traditional Media 3 hrs.
Individual expression involving use of mixed wet and dry materials, assemblage, collage, shaped and contoured canvasses and related media. Lab fee: Level 2. Prerequisites: ARH 100 or 101, ARS 120, 121 and 160 or approval of instructor.

380 Printmaking: Intaglio 3 hrs.
Beginning studio practice in etching, engraving, aquatint, and dry-point. Lab fee: Level 2. Prerequisites: ARH 100 or 101, ARS 120, 121 and 160 or approval of instructor.

381 Printmaking: Stone Lithography 3 hrs.
Beginning studio practice in lithography. Lab fee: Level 2. Prerequisites: ARH 100 or 101, ARS 120, 121, 160 or approval of instructor.

382 Printmaking: Relief 3 hrs.
Beginning studio practice in relief-print media, utilizing woodcut, wood-engraving, linoleum-related relief techniques. Hand and mechanical press usage. Lab fee: Level 2. Prerequisites: ARH 100 or 101, ARS 120, 121, 160 or approval of instructor.

383 Printmaking: Screenprinting 3 hrs.
Silkscreen color printing for fine art and commercial use. Various stencil techniques, including the latest professional handcut film and photographic methods. Recommended for Communication Graphics students. Lab fee: Level 3. Prerequisites: ARH 100 or 101, ARS 120, 121 and 160 or approval of instructor.

387 Printmaking: Aluminum-Plate Lithography 3 hrs.
Basic hand-drawn techniques and photo processes in aluminum-plate lithography. Lab fee: Level 2. Prerequisites: ARH 100 or 101, ARS 120, 121, 160 or approval of instructor.

390 Mixed Media 3 hrs.
Study and practice of art approaches which combine elements of various art forms such as design, painting or photography/film and may include elements otherwise foreign to the visual arts, such as theatrical or industrial processes and materials. Lab fee: Level 2. Prerequisites: ARH 100 or 101, ARS 120, 121, 160 or approval of instructor.

Senior level studio courses are to be taken only after the successful completion of a minimum of three 300-level studio courses or the proper prerequisites. Communication graphics specialists must complete ARS 430, 431, and 432 which may be taken in any sequence. Interior design specialists must complete ARS 410, 411 and 412. ARS 411 and 412 must be completed in sequence. All other studio students must complete ARS 400, 401 and 402 which may be taken in any sequence; however, no other studio courses should be attempted while completing these courses.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>Senior Problems in Studio Art: Lab fee: Level 2</td>
<td>3 hrs.</td>
<td></td>
</tr>
<tr>
<td>401</td>
<td>Senior Problems in Studio Art: Lab fee: Level 2</td>
<td>3 hrs.</td>
<td></td>
</tr>
<tr>
<td>402</td>
<td>Senior Problems in Studio Art: Lab fee: Level 2</td>
<td>3 hrs.</td>
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</tr>
</tbody>
</table>

One section of this latter series will be offered each term, and will be conducted by a different member of the studio faculty. Each of these senior level courses will consist of the production and critical evaluation of exhibition quality works in any medium for which the student is qualified by previous experiences (100 through 300 levels).

<table>
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<th>Course Code</th>
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</thead>
<tbody>
<tr>
<td>411</td>
<td>Interior Design: Advanced Residential and Commercial Design</td>
<td>3 hrs.</td>
<td>Advanced development of skills in residential and commercial planning and drawing relating to interior design. Development of residential and commercial floor plans, kitchen fixture planning, bathroom and restroom facilities, restoration, fire code material resistance, lighting specifications, space planning and presentation techniques. Lab fee: Level 2. Prerequisites: ARS 310, 311, 312 and 410.</td>
</tr>
<tr>
<td>490</td>
<td>Honors Project</td>
<td>3 hrs.</td>
<td>Independent work in studio leading to a solo exhibition. Course must be followed by ARS 491.</td>
</tr>
<tr>
<td>491</td>
<td>Honors Project</td>
<td>3 hrs.</td>
<td>Independent work in studio leading to solo exhibition in last term of senior year. Prerequisite: ARS 490</td>
</tr>
</tbody>
</table>
495 Technical Problems 3 hrs.
Technical problems in studio disciplines for which advance courses are not available. Course can be repeated for a total of 6 hours credit. Prerequisites: Advanced standing in studio disciplines concerned and permission of instructor.

Art History (ARH)

100 Art History Survey: Ancient to Modern 3 hrs.
Major monuments, periods and movements in the history of art from the caves of Lascaux to the beginning of the modern movement. The course will also teach the fundamentals of art historical methodology.

101 Art History: Armory Show (1913) to the Present 3 hrs.
The course is designed to acquaint the student with developments in art since the Armory Show. Major themes, artists and critical issues will be examined.

109 Art Appreciation for Non-Majors 3 hrs.
This course will examine the work of art as object, image and idea, its physical, formal, and intellectual aspects. Material covered will include drawing, painting, sculpture, printmaking, photography and architecture.

Upper Division

300 Colonial and Nineteenth Century American Art 3 hrs.
American art, architecture and design prior to World War I. Emergence of a national style and its relationship to European art. Prerequisites: ARH 100 and 101 or approval of instructor.

301 Classical Art 3 hrs.
Art and architecture of the ancient world to rise of Christianity and decline of the classical world. Prerequisites: ARH 100 and 101 or approval of instructor.

302 Medieval Art 3 hrs.
The rise of art in the Western world. Topics covered will include Early Christian, Byzantine, Carolingian, Ottonian, Romanesque, and Gothic art and architecture. Prerequisites: ARH 100 and 101 or approval of instructor.

303 Renaissance Art 3 hrs.
The art of Europe from 1250 to 1527. The rise of the artist as a creative individual, and his expanding role in society. The works of such northern and southern masters as Van Eyck, Durer, Da Vinci, Michelangelo, and Titian will be studied. Prerequisites: ARH 100 and 101 or approval of instructor.

304 Twentieth Century Art 3 hrs.
A survey of the developments in Europe and America from 1890 to the present. Major movements including Cubism through Dadaism and Surrealism, to the pluralism of contemporary art. Prerequisites: ARH 100 and 101 or approval of instructor.

306 Baroque and Rococo Art 3 hrs.
Development of baroque and rococo art in Europe. Architecture of Borromini, sculpture of Bernini, painting of Rubens, Rembrandt, Velasquez, Poussin, and Watteau will be examined. Prerequisites: ARH 100 and 101 or approval of instructor.

309 Period Styles in Interior Design 3 hrs.
A survey of the historical development of European and American interior design styles including Classical, Victorian, Art Nouveau, Bauhaus, and contemporary trends. Prerequisites: ARH 100 and 101 or approval of instructor.
Nineteenth Century Art in Europe

Survey of developments in art from 1780 to 1890: neo-classicism, romanticism, realism, impressionism and symbolism will be studied through the works of such artists as David, Goya, Courbet, Van Gogh and others. Prerequisites: ARH 100 and 101 or approval of instructor.

Senior-level courses involve independent initiative of the degree candidate. The student should have completed all foundation courses and all GER before commencing senior program.

ARH 400, 401 and 402 include discussion and guided research on artists, works of art, and subjects closely related to art.

Art History Seminar: Renaissance and Baroque Art

Methods of developing a scholarly research paper. Prerequisites: Upper division standing and ARH 303 and 306 or approval of instructor.

Art History Seminar: Modern Art

Methods of developing a scholarly research paper. Prerequisites: Upper division standing and ARH 304 and 310 or approval of instructor.

Art History Seminar: American Art

Methods of developing a scholarly research paper. Prerequisites: Upper division standing and ARH 300 and 304 or approval of instructor.

Trends in Post-1945 Art

Contemporary developments in the visual arts. Prerequisites: Upper division standing and ARH 304 or approval of instructor.

Art History Seminar: The Literature of Art History

Important theoretical and critical writings on visual arts to acquaint the advanced student with modes of art historical thought. Readings of artists' letters and journals, nineteenth and twentieth century critical reviews, as well as scholarly investigations by Heinrich Wolfflin, Erwin Panofsky, E.H. Gombrich, George Kubler, Meyer Schapiro, and others. Prerequisites: Upper division standing and one 300-level course or approval of instructor.

Art History Seminar: History of Women Artists

An attempt to answer the query, "Why have there been no great women artists?" The works of such artists as Gentileschi, Kauffmann, Cassatt, and O'Keeffe, in the context of women's role in Western society form the Middle Ages to the present. Prerequisites: Upper division standing and two of the following: ARH 304, 306, 310 or approval of instructor.

Honors Project

Independent study in art history leading to the presentation of a research paper at a seminar meeting. Course must be followed by ARH 491.

Honors Project

Independent study in art history leading to the presentation of a research paper at a seminar meeting during the senior year. Prerequisite: ARH 490

Special Problems in Art History

Directed reading and research. Prerequisites: Advanced standing, 12 semester hours of art history, previous course work in area to be studied, and approval of instructor.
Education and Developmental Learning Department

Professor Wharry; Professor Emeritus Engle; Associate Professors Brindley, Gibson, Kilgo; Adjunct Associate Professors Haralick, Kirkpatrick; Assistant Professors Butts (chairman), Shiver; Adjunct Assistant Professor Oliver; Adjunct Instructors Bell, McHugh.

Graduate and undergraduate programs in both Education and Developmental Learning are offered by the department. The department coordinates the composite major in Human Growth and Development.

Undergraduate Study in Education

Students in the School of Arts, Humanities, and Social Sciences, the School of Mathematical and Natural Sciences, or the School of Administrative Science, who wish to qualify for the Alabama Class B Elementary, Middle, High School or N-12 professional teachers certificate must meet the requirements as set forth below. Students who choose to major in teacher education and qualify for teacher certification should contact the Chairman of the Department of Education for assignment of an adviser as early as the freshman year. Students must also counsel with advisers from other approved academic departments to coordinate planning of programs of study. The N-12 certification programs are available only in art and music.

Admission to the Teacher Education Program

During the winter or spring term of the sophomore year, students should apply for admission to the Teacher Education Program with the Education Department. Transfer students who have completed two years of undergraduate study must submit the application after completion of nine semester hours of work at UAH. Applicants must: (1) have a cumulative GPA of 2.20 on all work attempted, (2) have completed at least 70% of the GER, (3) have presented acceptable confidential evaluations prepared on proper forms, (4) have satisfactory performance on the State English Language Proficiency Test, (5) have satisfactory interview(s) with representatives of the Department of Education, and (6) have a minimum score of 16 on the ACT taken within five years prior to admission or equivalent SAT scores. Students may elect to be re-examined on all tests. All students admitted to the program will have a teacher education adviser assigned to them, as well as an adviser in the teaching field(s).

Application for Student Teaching

Before April 15 of the junior year, students admitted to the teacher education program should make application for a student teaching/internship assignment for one term of the senior year. The following additional criteria must be met before the internship assignment is made; (1) a GPA of 2.20 on all work attempted and a GPA of 2.2 in all work attempted in the teaching field(s), (2) A GPA of 2.20 in all work attempted in education courses, and (3) satisfactory completion of all appropriate GER.
Initial Certification

Near the end of the teacher education program, a student who wishes to apply for an Alabama teaching certificate should complete the Alabama State Department of Education certification application at the Office of Admissions and Records.

To be recommended for the teaching certificate a student, in addition to fulfilling the general degree requirement, must satisfactorily complete an approved program with at least a 2.20 GPA on all work attempted and at least a 2.20 GPA on all work attempted in the teaching field(s) and in professional education. Additionally, the student must pass the State Department of Education initial teacher certification examination.

Successful completion of the bachelor's program in teacher education leads to Alabama Class B certification which is valid for eight years. This certification may be renewed upon verification of successful teaching for four of the eight years and completion of an approved professional development program; or earning twelve semester hours of upper division or graduate level credit in the certification areas. Teachers are encouraged to earn Class A certification which may be incorporated into their employer's professional development program.

Students seeking certification in other states may have to meet the specific requirements of those states. Many may claim reciprocity from Alabama through interstate agreements held by the State of Alabama Department of Education.

Elementary Education

The curriculum in elementary education is planned to provide a broad liberal education base and professional studies in elementary education, including an in-depth study of a single discipline, to prepare the elementary teacher for general responsibilities expected of all teachers, the specific competencies of the elementary classroom, as well as team teaching and master-teacher roles in public and private elementary schools. In addition, this curriculum provides a ready base for movement into the middle school, if the teacher so desires.

Because of the scope of the elementary education program the student must inform the Education Department of his/her goals as early as possible. The student will be assigned as adviser to aid in planning an effective course of study. This planning also requires the student to seek counseling from an adviser in the department of the student’s cognate area of study.

Upon successful completion of the elementary education program, the student will be awarded a B.A. degree, will be recommended for the Alabama Class B Elementary Professional Teachers Certificate, and will be qualified to teach in grades 1-6.
**General Studies (60 semester hours required):**

<table>
<thead>
<tr>
<th>Humanities (15 semester hours required):</th>
<th>Semester Hours</th>
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</thead>
<tbody>
<tr>
<td>EH 101, 102 or 103, 104 ..................</td>
<td>6</td>
</tr>
<tr>
<td>Literature* ..................................</td>
<td>6</td>
</tr>
<tr>
<td>Communication or fine arts or linguistics*</td>
<td>6</td>
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<table>
<thead>
<tr>
<th>Social Sciences (12 semester hours required):</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>HY 101, 102, or 391, 392 .....................</td>
<td>6</td>
</tr>
<tr>
<td>Economics* .....................................</td>
<td>3</td>
</tr>
<tr>
<td>Economics, geography, political science,</td>
<td>3</td>
</tr>
<tr>
<td>psychology or sociology*</td>
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</table>

<table>
<thead>
<tr>
<th>Natural and Physical Sciences, including Mathematics (15 semester hours required):</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS 111, 112, 113 or appropriate combination of biological and physical sciences*</td>
<td>12</td>
</tr>
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<table>
<thead>
<tr>
<th>Health Education or Physical Education (3 semester hours):</th>
<th>Semester Hours</th>
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</thead>
<tbody>
<tr>
<td>HPE* (Including HPE 190 or 194) ..................................</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional general studies (15 semester hours required):**

<table>
<thead>
<tr>
<th>Group I: Social sciences or natural and physical sciences or mathematics</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group II: (If only 6 hours of FLL is needed, elect 6 hours from humanities or social or natural or physical sciences or mathematics.*).</td>
<td>0-6</td>
</tr>
</tbody>
</table>

**Professional Studies (72 semester hours required):**

<table>
<thead>
<tr>
<th>Humanistic and Behavioral Studies (12 semester hours required):</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED 230 Human Development ...........................................</td>
<td>3</td>
</tr>
<tr>
<td>ED 261 Foundations of Education in the United States ...............</td>
<td>3</td>
</tr>
<tr>
<td>ED 263 Education Psychology .........................................</td>
<td>3</td>
</tr>
<tr>
<td>ED 593 Education of Exceptional Children and Youth ...............</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Studies in Elementary School Curriculum Areas (27 semester hours required):</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED 215 Physical Education for the Elementary Teacher .........................</td>
<td>3</td>
</tr>
<tr>
<td>ARS 215 Art for the Elementary Teacher .........................................</td>
<td>3</td>
</tr>
<tr>
<td>MU 215 Music for the Elementary Teacher ......................................</td>
<td>3</td>
</tr>
<tr>
<td>ED 371 Language Arts or Ed 400 Literature for Children and Adolescents.</td>
<td>3</td>
</tr>
</tbody>
</table>

*See counselor/advisor in Education for details on options.

136
Cognate Area of Study (Includes 15 hours; 300 level or above, from a single subject matter discipline)** .......................................................... 15

Curriculum and Teaching (12 semester hours):
ED 300 Group Processes .......................................................... 3
ED 372 Teaching the Social Studies ................................................. 3
ED 373 Teaching the Natural Sciences ............................................. 3
ED 374 Teaching of Arithmetic ...................................................... 3

Evaluation of Teaching Learning (3 semester hours required):
ED 360 Diagnostic and Prescriptive Teaching .................................. 3

Reading (6 semester hours required):
ED 375 Teaching of Reading ....................................................... 3
ED 408 Reading in the Content Areas ............................................ 3

Internship (9 semester hours required):
ED 493 Elementary Internship .................................................... 9

Electives (3 semester hours required):
Professional or Teaching Field electives* ..................................... 3

Total Hours in Program .......................................................... 132

*See counselor/adviser in Education Department for details on options and requirements in these categories.

**A student planning to teach in an elementary field must select an area from any academic department that offers a program approved for certification by the State Department of Education. Approved programs in the School of Arts, Humanities and Social Sciences are: art, English, history, French, German, Russian, Spanish, music, political science, psychology and sociology. Approved programs in the School of Mathematical and Natural Sciences are: biology, chemistry, mathematics and physics. Economics is an approved program in the School of Administrative Science.

Middle/Junior High School Education
The curriculum in middle/junior high school education is planned to provide a broad liberal base, professional studies in middle school education, and an in-depth study of two disciplines or of selected comprehensive fields (social science, language arts or general science) to prepare teachers for serving in traditional junior high schools or the emerging middle schools. Students may, at their option, add certification in an adjacent field, i.e., high school education, with additional coursework and internships. This program is designed to prepare teachers especially trained in dealing with youngsters undergoing the developmental changes of late childhood, puberty, and early adolescence. The emphasis will be on preparing academic generalists rather than specialists in subject fields.
Students should seek counseling as early as possible. Advisers will be assigned in both professional education and in the teaching fields. The student will earn a B.A. or B.S. depending on the chosen field(s). Upon successful completion of the program the student will be recommended for the Alabama Class B Middle/Junior High School Certificate and will be qualified to teach in grades 4-8.

General Studies (60 semester hours required):

<table>
<thead>
<tr>
<th>Humanities (15 hours required):</th>
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<tbody>
<tr>
<td>EH 101, 102 or 103, 104</td>
<td>6</td>
</tr>
<tr>
<td>Literature*</td>
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<tr>
<td>Communication or fine arts or philosophy or linguistics*</td>
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</table>

<table>
<thead>
<tr>
<th>Social sciences (12 semester hours required):</th>
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</tr>
</thead>
<tbody>
<tr>
<td>HY 101, 102, or 391, 392</td>
<td>6</td>
</tr>
<tr>
<td>Economics*</td>
<td>3</td>
</tr>
<tr>
<td>Economics, geography, political science, psychology, or sociology*</td>
<td>3</td>
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</thead>
<tbody>
<tr>
<td>NS 111, 112, 113 or appropriate combination of biological and physical sciences*</td>
<td>12</td>
</tr>
<tr>
<td>Mathematics*</td>
<td>3</td>
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</table>

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<thead>
<tr>
<th>Health education or physical education (3 semester hours required):</th>
<th>Semester Hours</th>
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</thead>
<tbody>
<tr>
<td>HPE* (HPE 190 or 194 required)</td>
<td>3</td>
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<tr>
<th>Additional general studies (15 semester hours required):</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLL (French, German, Russian, or Spanish)</td>
<td>6-12</td>
</tr>
<tr>
<td>Group I: social sciences or natural and physical sciences*</td>
<td>3</td>
</tr>
<tr>
<td>Group II: (If only 6 hours of FLL is needed, elect 6 hours from humanities or social or natural or physical sciences or mathematics*</td>
<td>0-6</td>
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<thead>
<tr>
<th>Professional Studies (39 semester hours required):</th>
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</thead>
<tbody>
<tr>
<td>ED 230 Human Development</td>
<td>3</td>
</tr>
<tr>
<td>ED 261 Foundations of Education in the United States</td>
<td>3</td>
</tr>
<tr>
<td>ED 263 Educational Psychology</td>
<td>3</td>
</tr>
<tr>
<td>ED 593 Education of Exceptional Children and Youth</td>
<td>3</td>
</tr>
<tr>
<td>Reading (6 semester hours required):</td>
<td>3</td>
</tr>
<tr>
<td>ED 408 Reading in the Content Areas</td>
<td>3</td>
</tr>
</tbody>
</table>

*See adviser in Education Department for details on options and requirements in these categories.

**For the B.S. in physics, biological sciences, or chemistry, the science and mathematics requirement may be different. Seek advisement from the appropriate department.
ED 375 Teaching of Reading, or ED 400 Literature for Children and Adolescents .......................... 3

Curriculum and teaching (9 semester hours required):
ED 388 Teaching Middle and High School Subjects ......................................................... 3
ED 490 Senior Seminar in Education ................................................................. 3
ED 300 Group Processes, or ED 360 Diagnostic and Prescriptive Teaching ......................... 3

Evaluation of teaching and learning (3 semester hours required):
ED 510 Foundations of Educational Evaluation ...................................................... 3

Internship (9 semester hours required):
ED 495 Middle School Internship ................................................................. 9

**Teaching Field(s)**

The student is required to have two teaching fields or one comprehensive teaching field.

Approved single teaching fields are: French, German, Russian, Spanish, English, mathematics, biology, chemistry, physics, economics, history, political science, psychology and sociology. Approved comprehensive teaching fields are: language arts, general science, and social science. The total number of semester hours in a student's program will vary from a low of some 130 hours to a high of about 145 hours, depending on the teaching field. The student should seek advisement from the Education Department on this matter. The specific program of studies in the teaching field(s) will be developed with advisers from the chosen fields.

Students seeking middle school certification are encouraged to consider selecting the comprehensive programs as they are felt to be the better preparation for teaching at that level.

**High School Education**

The curriculum in high school education is planned to provide a broad liberal base, professional studies in high school teaching, and an in-depth study of two disciplines or of selected comprehensive fields (social science, language arts, general science) for the purpose of preparing teacher for service in senior high schools. Students may, at their option, also seek certification in middle/junior high school education, with additional coursework and internships. Preparation will be rigorous and will equip the teacher to work in the high school setting and to deal with adolescents.

Students should seek counseling as early as possible. Advisers will be assigned in both professional education and in the teaching field(s). The student will earn a B.A. or B.S. depending on the field chosen. Upon successful completion of the program the student will be recommended for the Alabama Class B High School Certificate, and will be qualified to teach in grades 7-12.
<table>
<thead>
<tr>
<th>Course Description</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General Studies (60 semester hours required):</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Humanities (15 semester hours required):</strong></td>
<td></td>
</tr>
<tr>
<td>EH 101, 102 or 103, 104</td>
<td>6</td>
</tr>
<tr>
<td>Literature*</td>
<td>6</td>
</tr>
<tr>
<td>Communication or fine arts or philosophy or linguistics*</td>
<td>3</td>
</tr>
<tr>
<td><strong>Social sciences (12 semester hours required):</strong></td>
<td></td>
</tr>
<tr>
<td>HY 101, 102 or 391, 392</td>
<td>6</td>
</tr>
<tr>
<td>Economics*</td>
<td>3</td>
</tr>
<tr>
<td>Economics, geography, political science, psychology, or sociology</td>
<td>3</td>
</tr>
<tr>
<td><strong>Natural and physical sciences, including mathematics</strong></td>
<td></td>
</tr>
<tr>
<td>NS 111, 112, 113, or appropriate combination of biological and physical science*</td>
<td>12</td>
</tr>
<tr>
<td>Mathematics*</td>
<td>3</td>
</tr>
<tr>
<td><strong>Health education or physical education</strong></td>
<td></td>
</tr>
<tr>
<td>HPE* (HPE 190 or 194 required)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Additional general studies</strong></td>
<td></td>
</tr>
<tr>
<td>FLL (French, German, Russian, or Spanish)</td>
<td>6-12</td>
</tr>
<tr>
<td>Group I: Social science or natural and physical sciences or mathematics*</td>
<td>3</td>
</tr>
<tr>
<td>Group II: (If only 6 hours of FLL is needed, elect 6 hours from humanities or</td>
<td>0-6</td>
</tr>
<tr>
<td>social or natural or physical sciences or mathematics*)</td>
<td></td>
</tr>
<tr>
<td><strong>Professional Studies (33 semester hours required):</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Humanistic and behavioral studies</strong></td>
<td></td>
</tr>
<tr>
<td>ED 230 Human Development.</td>
<td>3</td>
</tr>
<tr>
<td>ED 261 Foundations of Education in the United States.</td>
<td>3</td>
</tr>
<tr>
<td>ED 263 Educational Psychology.</td>
<td>3</td>
</tr>
<tr>
<td>ED 593 Education of Exceptional Children and Youth.</td>
<td>3</td>
</tr>
<tr>
<td><strong>Curriculum and Teaching (6 semester hours required):</strong></td>
<td></td>
</tr>
<tr>
<td>ED 388 Teaching Middle and High School Subjects.</td>
<td>3</td>
</tr>
<tr>
<td>ED 490 Senior Seminar in Education.</td>
<td>3</td>
</tr>
<tr>
<td>**For the B.S. in biological sciences, chemistry and mathematics requirements</td>
<td></td>
</tr>
<tr>
<td>may be different. Seek advisement from the appropriate department.</td>
<td></td>
</tr>
</tbody>
</table>
Teaching Reading in Content Areas
(3 semester hours):
   ED 408 Reading in the Content Areas.............................. 3

Evaluation of Teaching and Learning
(3 semester hours required):
   ED 510 Foundations of Educational Evaluation..................... 3

Internship (9 semester hours required):
   ED 497 High School Internship ................................... 9

Teaching Field(s):
The student is required to have two teaching fields or one comprehensive teaching field.
Approved single teaching fields are: French, German, Russian, Spanish, English, mathematics, biology, chemistry, physics, economics, history, political science, psychology and sociology.
Approved comprehensive teaching fields are: language arts, general science, and social science.
The number of hours required varies from one teaching field to another. The student should seek advisement from the Education Department on this matter. The specific program of studies in the teaching field(s) will be developed with advisers from the chosen fields.

N-12 Education
Programs are available in art and in music leading to Alabama Class B Certification for grades N-12. There is one program available in art education and two programs in music education (Instrumental, and Vocal/Choral). The general studies and professional studies components are slightly different from those found in the elementary, middle and high school programs. These programs are also devoted to providing a broad liberal base of studies. Preparation in the arts has traditionally been rigorous and extensive and these programs are no exception. Students should expect to take more than the minimum of 132 hours required for graduation. Early counseling with advisers is strongly recommended.

Art
General Studies (60 semester hours required):
   Humanities (15 semester hours required):
      EH 101, 102 or 103, 104......................................... 6
      Literature*.................................................. 6
      ARH 100..................................................... 3
   Social sciences (12 semester hours required):
      HY 101, 102 or 391, 392....................................... 6
      Economics*.................................................. 3
      Economics, geography, philosophy, political science, psychology, or sociology...................................... 3
*See adviser in Education Department for details on options and requirements in these categories.
Natural and physical sciences, including mathematics
(15 semester hours required):
  NS 111, 112, 113, or appropriate combination of
  biological and physical science* ................................ 12
  Mathematics* ...................................................... 3
Health education or physical education
(3 semester hours required):
  HPE* (HPE 190 or 194 required) .................................. 3
Additional general studies
(15 semester hours required):
  FLL (French, German, Russian, or Spanish) .................. 6-12
  Group I: social science or natural and physical
  sciences or mathematics* ........................................... 3
  Group II: (If only 6 hours of FLL is needed,
  elect 6 hours from humanities of social or
  natural or physical sciences or mathematics*) ............. 0-6

Professional Studies (36 semester hours required):
  Humanistic and behavioral studies
  (12 semester hours required):
    ED 230 Human Development ..................................... 3
    ED 261 Foundations of Education in the
    United States .................................................. 3
    ED 263 Educational Psychology ................................ 3
    ED 593 Education of Exceptional Children
    and Youth .......................................................... 3
  Curriculum and Teaching (9 semester hours required):
    ARS 215 Art for the Elementary
    Teacher ............................................................ 3
    ED 388 Teaching Middle and High
    School Subjects .................................................. 3
    ED 490 Senior Seminar in Education ............................ 3
  Teaching Reading in Content Areas
  (3 semester hours):
    ED 408 Reading in the Content Areas ......................... 3
  Evaluation of Teaching and Learning
  (3 semester hours required):
    ED 510 Foundations of Educational Evaluation ............. 3
  Internship (9 semester hours required):
    ED 499 N-12 Internship (Note: Assignment will
    be at both elementary and secondary levels.)

*See adviser in Education Department for details of options and re­
quirements in these categories.
Teaching Field (Art):
The major in art education is made up of some 51 semester hours of work, part of which may be included in the general studies component. This program should be planned with the Art Department providing advice and approval.

Music (Instrumental and Vocal/Choral)

General Studies (60 semester hours required):

<table>
<thead>
<tr>
<th>Humanities (15 semester hours required):</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED 101, 102 or 103, 104</td>
<td>6</td>
</tr>
<tr>
<td>Literature*</td>
<td>6</td>
</tr>
<tr>
<td>MU 110</td>
<td>3</td>
</tr>
</tbody>
</table>

Social sciences (12 semester hours required):

| HY 101, 102 or 391, 392                 | 6              |
| Economics*                             | 3              |
| Economics, geography, political science, psychology, or sociology* | 3 |

Natural and physical sciences

(12 semester hours required):

| NS 111, 112, 113, or appropriate combination of biological and physical science* | 12 |

Health education or physical education

(3 semester hours required):

| HPE* (HPE 190 or 194 required) | 3 |

Additional general studies

(21 semester hours required):

| FLL (French, German, Russian, or Spanish) | 6-12 |
| Mathematics*                             | 3   |
| Group I: humanities or social or natural or physical sciences | 3 |

Group II: (If only 6 hours of FLL is needed, elect 6 hours from humanities of social or natural or physical sciences or mathematics*).

(30 semester hours required):

| AHS 100 The Art of Being Human            | 3   |
| ED 230 Human Development                  | 3   |
| ED 261 Foundations of Education in the United States | 3 |
| ED 263 Educational Psychology             | 3   |
| ED 593 Education of Exceptional Children and Youth | 3 |

Curriculum and Teaching (12 semester hours required):

*See adviser in Education Department for details of options and requirements in these categories.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUE 225</td>
<td>Introduction to Music Education</td>
<td>1</td>
</tr>
<tr>
<td>MUE 326</td>
<td>Teaching General Music in Elementary School</td>
<td>3</td>
</tr>
<tr>
<td>MUE 327</td>
<td>Teaching General Music in Secondary School</td>
<td>3</td>
</tr>
<tr>
<td>MUE 428</td>
<td>Org. &amp; Dir. Vocal Gr. in Secondary School</td>
<td>2</td>
</tr>
<tr>
<td>ED 490</td>
<td>Senior Seminar in Education</td>
<td>3</td>
</tr>
<tr>
<td>ED 408</td>
<td>Reading in the Content Areas</td>
<td>3</td>
</tr>
<tr>
<td>ED 408</td>
<td>Reading in the Content Areas</td>
<td>3</td>
</tr>
<tr>
<td>ED 510</td>
<td>Foundations of Educational Evaluation</td>
<td>3</td>
</tr>
<tr>
<td>ED 499</td>
<td>N-12 Internship</td>
<td>9</td>
</tr>
</tbody>
</table>

**Teaching Field (Music: Instrumental or Vocal/Choral):**

The majors in music education (both instrumental and vocal/choral) are made up of some 48-51 semester hours of coursework, part of which may be counted as general studies. These programs of study should be planned with the Music Department providing advice and approval.

**Other Considerations**

Students seeking certification in elementary, middle, high school, or N-12 education programs will have opportunity for electives by judicious planning of their general studies courses and within their major(s).

Students may substitute appropriate courses taken at another institution with permission of the Education Department if equivalency is established.

It should be noted that the requirements for the bachelor's degree will exceed 132 hours in most areas.

**Multiple Certification**

Under the new State of Alabama plan, there are five levels of certification of teachers, namely: N-3, 1-6, 4-8, 7-12, and N-12. UAH offers all options except the N-3 option. For a person certified for grades 1-6 under the new standards, adding middle school endorsement would also permit teaching in grades 7 and 8 in the teaching field(s) for which the person has completed the requirements as otherwise outlined in this Catalog. For a person with high school certification, adding middle school endorsement would also permit teaching in grades 4-6 in the teaching field(s) for which the person has completed the requirements. A person beginning with a middle school program would have the option of moving to either high school endorsement or elementary school endorsement.
Elementary education students who wish to extend their preparation to include endorsement in grades 7 and 8 may obtain a middle school endorsement by completing an approved program consisting of the following:

1. a course in the understanding of the purposes and design of the middle school, including its curriculum;
2. a course in the appreciation for and an understanding of the unique nature of the developing human organism during the preadolescent and early adolescent years;
3. an appropriate teaching field of at least 27 semester hours selected from those approved at UAH.

Students completing a high school education program who wish to extend their preparation to include endorsement in grades 4-6 may obtain a middle school endorsement by completing an approved program consisting of the following:

1. a methods course in using instructional strategies, media, and materials, appropriate for effective teaching of preadolescents;
2. a course in the understanding of the purposes and design of the middle school as an institution, including its curriculum;
3. a course in the appreciation for and an understanding of the unique nature of the developing human organism during the preadolescent and early adolescent years;
4. a course designed for developing the knowledge and skills necessary to guide the continued growth and development of reading skills appropriate for the middle school child;
5. an appropriate teaching field major of at least 27 semester hours.

Education (ED)

111 Career Exploration 1 hrs.
Educational and vocational planning. Prerequisites: 9 hours college credit and placement tests.

115 Effective Reading and Study skills 3 hrs.
Basic reading-skill development in class activities to raise skills on literal, interpretive, critical, and creative levels of comprehension.

261 Foundations of Education in the United States 3 hrs.
Development of education in America and its relation to prospective teachers. Prerequisite: sophomore standing.

263 Educational Psychology 3 hrs.
Psychological principles basic to an understanding of the learner, the learning process, and the learning situation. Prerequisites: PY 103 and sophomore standing.

325 The Sociology of Education 3 hrs.
Sociological approach to the study of education as a social institution; its structure, function and role in contemporary life. Prerequisite: SOC 100 or approval of instructor. (Same as SOC 325).
411 Guidance for Teachers
Sociological, psychological, and philosophical bases for guidance in schools. 3 hrs.

456 Mental Health in the School
Dynamics of behavior, recognition of minor maladjustments, criteria for referral, and classroom practices supporting good mental health. Prerequisite: ED 263 or equivalent or junior standing. 3 hrs.

467 Tests and Measurements
Survey of standardized and teacher-made evaluation instruments. 3 hrs.

500 Special Problems in Education
Independent study, special projects, and special in-service programs. Prerequisite: senior standing. 3 hrs.

502 Environmental Education
The general nature of ecological life systems, relationships of humankind and environment, major conservation problems facing the world today, exploration of alternate solutions and the tasks for educators. 3 hrs.

510 Foundations of Education Evaluation
Measurement process with emphasis on its relationship to problems of educational evaluation. Evaluation as an integral part of overall educational planning in addition to its use in measurement and evaluation of academic achievement. 3 hrs.

549 Audiovisual Instruction
Audiovisual media in teaching and the selection, use, and maintenance of audiovisual materials in educational programs. 3 hrs.

Elementary Education

215 Physical Education for the Elementary Teacher
Basic understanding of body alignment, developmental exercises and movement exploration activities for physical education in elementary grades. Study of student needs to provide proper equipment, facilities, and leadership for the overall program. 3 hrs.

230 Human Development
Overview of human development stressing continuity from conception to adulthood. Practical applications for teachers and parents. 3 hrs.

231 Teaching the Young Child
Total pattern of child development, curriculum, learning, methods, and guidance for the child from two to nine years of age. 3 hrs.

300 Group Processes
Major principles of group dynamics and their effective use in education. Informal group counseling experiences for better understanding of self and others as an integral part of the course methodology. Course is graded S/U only. (Enrollment for less than 3 hours credit only with permission of the instructor.) 3 hrs.

360 Diagnostic and Prescriptive Teaching
Strengths and deficiencies of student in academic area and a program to enhance strengths and remedy weaknesses. Group and individual processes. Prerequisites: ED 263, junior standing and admission to the Teacher Education Program. 3 hrs.

Note: ED 371 thru 375 include minimum of 16 hours laboratory experience in local elementary schools.
Language Arts 3 hrs.
Current practices in language arts instruction, materials, and characteristics of students. Development of all language arts skills to appropriate level. Prerequisite: ED 360.

Teaching the Social Studies 3 hrs.
Curriculum instructional approach, and materials for teaching social studies in grades 1-6. Helping beginning teachers acquire background skills in organizing and teaching units of work. Prerequisite: ED 360.

Teaching the Natural Sciences 3 hrs.
Examination, design, and evaluation of experiences for teaching natural sciences in the elementary school. Prerequisite: ED 360.

Teaching of Arithmetic 3 hrs.
Examination, design, and evaluation of experiences for teaching mathematics in elementary school. Modern trends in mathematics education. Prerequisite: ED 360.

Teaching of Reading 3 hrs.
Materials and methods in teaching reading with emphasis on skill and development, both developmental and remedial techniques, and planning of reading programs.

Literature for Children and Adolescents 3 hrs.
Relationship between developmental stages and literature that young people find relevant at various stages of growth. Understanding and appreciation of interdependence of experience and literature. Knowledge of the literature and critical assessment including use of library resources in teaching reading.

Observation and Participation in Teaching 3-6 hrs.
Selected observation and participation in elementary schools. For students in curricula designed for both elementary and secondary schools and for experienced teachers. Prerequisites: ED 230, 261, 263, 300, 360, three methods courses or equivalent approved courses, and an approved application for student teaching.

Elementary School Internship 9 hrs.
The course will focus on an apprenticeship training in a natural teaching-learning-environment. During the assignment the role of the student teacher will vary from that of being an interested observer to that of being responsible for the day-to-day teaching and learning activities within an assigned classroom. The student teacher is expected to assimilate university training and on-the-site activities in order to synthesize methods and strategies for future professional use. A minimum of 75 clock hours of actual teaching is required. Prerequisite General Education Requirements: ED 230, 261, 263, 300, 360 and three methods courses, or equivalent.

Elementary School Internship 3 hrs.
This course is essentially the same as ED 495. However, it will require a minimum of only 100 clock hours, including a minimum of some 25 hours of responsible teaching. It is to be used by persons seeking dual certification or by post-graduate students seeking additional areas of endorsement. Prerequisite: permission of the department chairman.

Middle and High School Education

Teaching Middle and High School Subjects 3 hrs.
(Major area of teaching to be designated.) Materials and methods in the major fields. Prerequisites: ED 263 and admission to Teacher Education Program.

Teaching Reading in the Content Area 3 hrs.
Provides knowledge of certain basic developmental and remedial reading skills, prac-
tices, and concepts. Extends those learned in previous, more fundamental, reading courses and shows how to apply fundamental skill and knowledge to the regular middle school/high school classroom. This will include adapting fundamentals of reading instruction to the various subject-matter areas (i.e., the sciences, social studies, English, etc.). Survey of special reading programs such as remedial reading and reading instruction as practiced in special education. Prerequisite: junior standing.

490 Senior Seminar in Education 3 hrs.
Course to be taken concurrently with student teaching. Prerequisites: ED 388 and senior standing.

495 Middle School Internship 9 hrs.
The course will focus on apprenticeship training in a natural teaching-learning environment. During the assignment the role of the student teacher/intern will vary from that of being an interested observer to that of being responsible for the day-to-day teaching and learning activities within an assigned classroom. The student teacher/intern is expected to assimilate university training and on-site activities in order to synthesize methods and strategies for future professional use. A minimum of 75 clock hours of actual teaching and some 300 hours overall is required. Prerequisites: all required professional education courses should be complete before admission to the program.

496 Middle School Internship 3 hrs.
This course is essentially the same as ED 495. However, it will require a minimum of only 100 clock hours, including a minimum of 25 hours of responsible teaching. It is to be used by persons seeking dual certification or by post-graduate students seeking additional areas of endorsement. Prerequisite: permission of the department chairman.

497 High School Internship 9 hrs.
Observation and student teaching in secondary schools. Prerequisites: ED 263, 388, 408, 518 and approved application for student teaching.

498 High School Internship 3 hrs.
This course is essentially the same as ED 497. However, it will require a minimum of only 100 clock hours, including a minimum of some 25 hours of responsible teaching. It is to be used by persons seeking dual certification or by post-graduate students seeking additional areas of endorsement. Prerequisite: permission of the department chairman.

Other Internships

499 N-12 Internship (Art, Music) 3 hrs.
Supervised teaching experience in local schools. A minimum of 75 clock hours of actual teaching and some 300 hours overall is required. Concurrent conferences arranged as needed. Prerequisite: an approved application for student teaching.

Graduate Study in Education

Master’s degrees are available in several academic areas and in certain professional areas, all leading to State of Alabama certification at the Class A level. Some options not leading to certification are also available.

Master’s degree programs sponsored jointly by the Department of Education and the School of Administrative Science leading to certification as elementary, middle school or high school principals are available. (See School of Administrative Science section.) About half of the program in these areas is made up of professional education work and about half of a general core in administrative science.
In the school of Arts, Humanities, and Social Sciences, programs are available leading to Class A Secondary and Middle School certification in history and English. Also available in the Developmental Learning Program are options leading to Class A Certification in Early Childhood Education for the Handicapped, Learning Disabilities, and School Psychometry. Non-certification programs are available in Developmental Processes and in Early Childhood Learning. (See Section on Developmental Learning.)

In the school of Mathematical and Natural Sciences, Class A programs are available leading to certification in middle and high school education in mathematics, chemistry, physics, and biological sciences. The graduate program in biological sciences is a joint U.A.H./Alabama A&M degree offering.

Special “Strengthened Subject Matter Programs” are also available from the Departments of English, History, Mathematics, Biological Sciences, Chemistry, and Physics leading to Class A high school certification.

The student should consult with advisers from the Education Department, as well as advisers from the other departments involved.

See appropriate Catalog sections for each department for details.

Note: Eligibility for Class B certification is a State Department of Education prerequisite for issuance of the Class A certificate. In addition, the student must provide proof of at least one year’s successful teaching experience as a prerequisite to issuance of the certificate. Further, if the Alabama Initial Teacher Certification Testing Program tests in the appropriate areas haven’t been passed, then the student must complete that requirement before issuance of the certificate. The student may elect to graduate, however, before completing all of these requirements.

To be admitted to graduate study in education, a student must meet the general requirements for admission as stated by the School of Graduate Studies.

600 Special Problems in Education  
1-3 hrs.  
Independent study, special projects, and in-service programs.

601 Public School Organization and Administration  
3 hrs.  
Systematic treatment of problems of local, state and national administration. New developments modifying educational administration, state authorization and organization, board of education, superintendent of schools, personnel and management, financial support, and public relations.

602 The Principal as Educational Leader  
3 hrs.  
Role of principal as supervisor, organizer, and administrator of schools, program of studies, teaching staff, pupil personnel, plant and equipment, and community relationships.

603 Sources of American Educational Thought  
3 hrs.  
Foundations of education in their philosophical, historical, social, and comparative aspects. Major relationships of schools and educative processes with society at large pointing to development of particular crucial issues.

604 Contributions of Psychology to Education  
3 hrs.  
Principles, theory, and practice of psychology for teaching and administrative service in educational institutions. Factors that determine learning and conditions of effective
teaching. Administrator and supervisor as organizer of the milieu wherein teaching, learning, and growth occur.

606 **Principles of Curriculum Development** 3 hrs.  
Principles of curriculum construction that underlie the reorganization of the program of studies for elementary and secondary schools. Origin and background of the curriculum, methods of organization, curriculum planning and development, and pertinent applications.

608 **The Educational Leader as Evaluator** 3 hrs.  
Procedures and techniques of empirical evaluation including a sampling of available instruments; and research approaches complementary to the course AS 627 (Quantitative Methods of Management). Evaluation of teacher and staff performance. Curricula, achievement and ability, media, and equipment, and plant and facilities. Preparation for maintenance of accountability.

609 **Fundamentals of Reading for Middle and Secondary Schools** 3 hrs.  
Instruction in developing reading skills and methods and materials in reading. Motivations of children and adolescents, functional reading and the atypical learner. Diagnosis and remediation of related deficiencies. Other related topics for regular and special education teacher. (Same as DL 609).

610 **Legal Aspects of Public School Administration** 3 hrs.  
Legal status of schools in the United States. Alabama conditions, school laws, constitutional provisions, judicial decisions. Attorney General’s rulings and regulations of State Board of Education.

611 **Principles of Guidance** 3 hrs.  
Sociological, psychological, and educational foundations of guidance; history and growth of the guidance movement; functions, scope, organization, and administration of guidance.

622 **Modern Elementary School Programs** 3 hrs.  
Evaluating new patterns of organization and the developing curriculum in elementary school.

626 **Modern Middle School Programs** 3 hrs.  
Survey of important viewpoints and issues, reorganization trends, typical research findings by subject fields and analysis of current curriculum proposals at the national, state, and local levels.

630 **Modern Secondary School Programs** 3 hrs.  
Important viewpoints and issues, reorganization trends, typical research findings by subject fields. Analysis of current curriculum proposals at the national, state, and local levels.

647, 648, 649 **Field Experience Practicum** 1 hr. each  
Student demonstration of performance competencies in school administration through field practicum. Students with committee approval may register for 647-648-649 individually or jointly. Course approval based upon committee’s evaluation of student’s readiness for field practicum. Courses individually scheduled to fit concurrently with student’s regular employment assignment.
Developmental Learning

The interdisciplinary program in Developmental Learning is general enough to furnish opportunities to study the developmental processes of the human organism, and to evaluate how the processes are affected by the physiological, psychological, sociological, and educational factors that impinge on the organism as it interacts with the environment. It provides the student with the opportunity to study the total developmental process and to see the ways in which that process is affected by the various factors impinging on the human organism. It provides training for persons who wish to become remedial and diagnostic specialists, resource and special class teachers associated with public or private schools, or specialists who work with psychologists, pediatricians, ophthalmologists, or optometrists, or other professionals, and for those who wish to direct clinical programs.

Programs are available at three levels:

1. A curriculum of some 60 semester hours leading to an associate certificate in Child Development.

2. A composite major in Human Growth and Development leading to a B.A. degree.

3. Five programs leading to a master's degree in Developmental Learning.
   a. Early Childhood Education for the Handicapped. This provides Alabama Class A Certification, if desired.
   b. Learning Disabilities. This provides Alabama Class A Certification, if desired.
   c. School Psychometry. This provides Alabama Class A Certification, if desired.
   d. Developmental Processes.
   e. Early Childhood Learning.

These programs are more specifically described as follows:

Associate Certificate in Child Development

The curriculum in child development prepares students to work in preschool programs other than those in public school. The program leads to an Associate in Child Development Certificate. Requirements for the associate certificate are as follows: (1) completion of 60 semester hours credit, including 24 to 26 hours in GER, 30 hours in the child development curriculum, and remaining hours in free electives and (2) an overall average of C in all courses attempted and all courses attempted in the child development curriculum.

Transfer students must earn at least 18 semester hours at UAH, including 6 hours in the child development curriculum and must complete 6 of the last 9 hours credit at UAH. In addition to the overall grade average, transfer students must have an average grade of C in all courses attempted at UAH.

Up to 30 semester hours of total requirements for the associate certificate may be earned by other than classroom work (e.g., CLEP, credit by examination, correspondence study, educational experiences in the armed forces, and professional certificate programs).
The GER for the associate certificate include the 24 to 26 semester hours credit as follows:

1. English Composition, 6 hours in (a) EH 101 and EH 102, or (b) CLEP English composition examination.
2. History-Social Sciences, 6 hours in (a) HY 101 and HY 102 or (b) history, sociology, psychology, political science, or economics courses or examination or (c) CLEP social sciences-history examination.
3. Science-Mathematics, 6 to 8 hours in (a) mathematics, biological sciences, physics, chemistry, or natural science courses or examination or (b) CLEP natural sciences examination or (c) CLEP mathematics examination.
4. Humanities, 6 hours in (a) EH 205 and EH 206 or (b) English, foreign languages, philosophy, music, or art courses or examinations or (c) CLEP humanities examination.

To continue studies toward the baccalaureate, students should select general education courses that will also apply toward requirements for the higher degree. In each of the above groups, courses listed as "(a)" are acceptable in most bachelor’s degree programs at UAH.

Child Development Curriculum ........................................ 30 hrs.
Required .............................................. CD 101, CD 203
Electives. 9 hours from the following: .................... CD 102, CD 201,
CD 202, CD 301, CD 302

Supporting courses
Required .............................................. SOC 100, PY 103
Electives. 9 hrs. from the following: .................... ARS 215, MU 215, ED 125,
ED 230, ED 263, ED 295

Free Electives ................................................ 4-6 hrs.

Students pursuing the certificate programs consult with an adviser and complete the declaration of intent form (DOI) after completion of the second course taken at UAH.

**Composite Major With Emphasis in Human Growth and Development**

The curriculum in Human Growth and Development encompasses development from the prenatal period through old age. It emphasizes accumulation of a general knowledge base and the development of skills to pursue professional goals. Career opportunities include positions in public and private agencies and specialized human service organizations. In addition, the program has special relevance for premed and nursing students.

A student should seek counseling upon entry into the program and select an adviser early in his course of study. The student must file an AOC before the end of his sophomore year.

The composite major in Human Growth and Development for a Bachelor of Arts degree will be awarded upon completion of the GER with 36 semester hours from the area of concentration and 21 semester hours in the minor area.

Required .............. SOC 106, AHS 300, PY 302, SOC 310, SOC 311, PY 315
PY 316, PY 510
Electives. 9 hrs. from the following: CD 102, SOC 306, SOC 345, SOC/PY 375, PY 401, PY 410, PY 433, PY 506

A minor in Human Growth and Development should include a minimum of 21 semester hours including the following:

Required: SOC 106, AHS 300, SOC 311, PY 315
Electives. 9 hrs. from the following: CD 102, PY 302, SOC 306, SOC 310, PY 316, SOC 345, PY/SOC 375, PY 401, PY 433, PY 506, PY 510

Graduate Program in Developmental Learning

The interdisciplinary program in Developmental Learning at the graduate level prepares persons to work with children and adults who have learning problems and to conduct research in human learning. Five options are offered: (1) Early Childhood Education for the Handicapped, (2) Learning Disabilities, (3) School Psychometry, (4) Developmental Processes, and (5) Early Childhood Learning. Graduate School Plans One (Thesis) and Two (Non-Thesis) are available. To be admitted to the graduate program in Developmental Learning, a student must meet the general requirements for admission to the School of Graduate Studies. For those students seeking Alabama Class A Certification, proof of at least one year’s teaching experience and passing scores on the Alabama Intial Teacher Certification Testing Program test in the area where an endorsement is sought is required. This latter requirement is necessary for certification but not for graduation. A person seeking the Class A certificate must also hold, or be eligible to hold, the Class B certificate.

Program Alternatives

Early Childhood Education for the Handicapped
Core: DL 603, 610, 628, 630, 640
Professional specialization: DL 601, 604, 605, 606, 626, 650 (01)
Electives: 3 hours from any non-required courses in developmental learning graduate program.

Learning Disabilities:
Core: DL 603, 610, 628, 630, 640
Professional specialization: DL 602, 604, 606, (609), 627, 650 (02)
Electives: 3 hours from any non-required course in the development learning graduate program.

School Psychometry:
Core: DL 603, 610, 628, 630, 640
Professional specialization: DL 604, 620, 626, 627, 631, 650 (03)
Electives: 3 hours from any non-required course in the development learning graduate program.
Developmental Processes
Core: ........................................... DL 603, 610, 628, 630
Professional specialization: ..................... DL 601, 606, 650 (04), (699)
Electives: 9 hours from any non-required courses in the developmental learning graduate program.

Early Childhood Learning
Core: ........................................... DL 603, 610, 628, 630
Professional specialization: ..................... DL 605, 606, 640, 650 (05)
Electives: 9 hours from any non-required courses in the developmental learning graduate program.

Students should seek counseling upon entry into the program and should select an adviser early in their course of studies. They must submit a plan of study before completion of 12 graduate hours.

Child Development (CD)

101 Introduction to Child Development 3 hrs.
Physical, social, emotional, and mental development of the young child; work functions, employment opportunities, and responsibilities of personnel trained in child development.

102 Child Nutrition and Health Care 3 hrs.
Basic information on human nutrition, nutritional value of food, and relationship of food and food habits to nutrition of the young child. Fundamental descriptions of diseases and disorders of children, preventive medicine, emergency treatment, and care of handicapped children.

201 Creative Activities 3 hrs.
Art and simple science media for use with young children; principles relating to choice, use, and value of creative media in enrichment opportunities for children.

202 Language Development 3 hrs.
Development of speech and language in the young child, basis for language growth, language arts in preschool and elementary school programs. Introduction to written expression. Identification of speech problems. Prerequisite: CD 101 or permission of coordinator.

203 Teaching the Young Child 3 hrs.
The pattern of child development, curriculum, learning, methods, and guidance of the child from two to nine years of age. Curricula for various types of preschool programs. Basic testing and evaluating the young child. Prerequisite: CD 101 or permission of coordinator.

301 Preschool Programs and Centers 3 hrs.
Preschool programs and centers. History and philosophy of preschool programs; legislation, standards, and program planning. Practical aspects of financing, administration, supervision, management, and evaluation. Prerequisite: CD 101 or permission of coordinator.

302 Preschool Practicum 3 hrs.
A structured program of observation and participation in a preschool center. Prerequisite: 12 semester hours in CD courses, including CD 101.
### Developmental Learning (DL)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>593</td>
<td>Education of Exceptional Children and Youth</td>
<td>3 hrs.</td>
<td>Introduction to the field of exceptional children and youth, including observations. This course, or equivalent, is a prerequisite to certification. (Same as ED 593)</td>
</tr>
<tr>
<td>600</td>
<td>Special Problems in Developmental Learning</td>
<td>1-3 hrs.</td>
<td>Independent study, special projects, and in-service programs. Elective only</td>
</tr>
<tr>
<td>601</td>
<td>Early Childhood Development</td>
<td>3 hrs.</td>
<td>Theories and issues regarding physical, psychological, and social growth and development and maturation in early childhood. Perceptual, cognitive, and psychomotor processes that directly affect learning and behavior. Normal development as a basis for analysis of the atypical. Observation required.</td>
</tr>
<tr>
<td>603</td>
<td>Sequential Development of the Human Organism</td>
<td>3 hrs.</td>
<td>Early learning processes in children from birth through maturation, from systematic motor exploration, through perceptual manipulation to cognitive operations. Observation and practicum.</td>
</tr>
<tr>
<td>604</td>
<td>Adaptive Academies</td>
<td>3 hrs.</td>
<td>Sequential and veridical approach to making adaptations in academic areas so that programs can be developed to help individuals who can learn best through adaptive and concrete procedures. Practicum.</td>
</tr>
<tr>
<td>605</td>
<td>Curriculum for Early Childhood Education</td>
<td>3 hrs.</td>
<td>Assessment findings and developmental objectives are linked so that individual programs can be developed. Curricula reflecting differing philosophies reviewed. In depth study of prominent curricula. Practicum.</td>
</tr>
<tr>
<td>606</td>
<td>Language Development</td>
<td>3 hrs.</td>
<td>Theories and stages of language development. Practicum in developing language skills.</td>
</tr>
<tr>
<td>609</td>
<td>Fundamentals of Reading for Middle and Secondary Schools</td>
<td>3 hrs.</td>
<td>Instruction in developing reading skills, methods, and materials in reading. Motivation of children and adolescents, functional reading in content areas, and reading and the atypical learner. Diagnosis and remediation of related deficiencies. Other related topics for regular and special education teacher. Prerequisite for LD students who have not completed a course in developmental reading. Observation (Same as ED 609).</td>
</tr>
<tr>
<td>610</td>
<td>Interdisciplinary Aspects of Intervention</td>
<td>3 hrs.</td>
<td>Psychological, sociological, and familial aspects of learning. Multidisciplinary approach to learning and problems that require intervention. Involvement of professionals and parents from the community.</td>
</tr>
<tr>
<td>625</td>
<td>Diagnostic Procedures: Advanced Psychometrics</td>
<td>3 hrs.</td>
<td>Psychometric theory and psychological tests. Psychometric issues such as standardization, validity, reliability and theory of testing. Standardized tests in areas of intelligence, psychomotor assessment, and personality. This course, or equivalent, is a prerequisite to the School Psychometry program. Practicum.</td>
</tr>
</tbody>
</table>
Diagnostic Procedures: Selected Tests for Preschoolers 3 hrs.
Practicum in administration, interpretation, and use of selected tests for pre-school children. A minimal level of competency will be required before the completion of the course. Lab fee: Level 9. Prerequisite: DL 601 or DL 603, or DL 605.

Diagnostic Procedures: Selected Tests for School-Age Children 3 hrs.
Advanced practicum in administration, interpretation and use of selected tests for school age children. Minimal level of competency will be required for all students before completion of the course. Lab fee: Level 9. Prerequisite: DL 604.

Theories and approaches to human learning. Emphasis on psychological (motivation, perception, and personality), sociological (cultural and familial), and neurophysiological factors as they impinge upon the learning environment. Concrete application of learning principles to solving learning problems in children and adults.

Behavior Modification 3 hrs.
Psychological principles concerning control of human behavior and current theoretical experimental research in behavior modification.

Research: Methodology and Statistics 3 hrs.
Research methodology emphasizing design and inferential statistics. Includes writing research proposals and critically reading research articles. Prerequisite: AHS 300 or an elementary undergraduate statistics course approved by the instructor.

Diagnostic Procedures: Stanford-Binet, Wechsler 3 hrs.
Practicum in administration, interpretation, and use of intelligence tests. Minimal level of competency will be required of all students before completion of course. Lab fee: Level 9. Prerequisite: AHS 300 or DL 630, DL 625, DL 626 or DL 627, and permission of instructor.

The Family in a Changing Society 3 hrs.
The family as the major agent of childhood socialization, growth, and development. Influence of rapid social change on family structure and its function as well as interaction of the family with other societal institutions. Effects of handicapped and chronically ill children on intramural relationships. Intervention programs for families and their handicapped and non-handicapped children.

Advanced Studies in Socialization 3 hrs.
Survey and analysis of comparative theories of socialization. Ways in which theoretical constructs may be transformed into effective child training practices.

Individual Readings 3 hrs.
Supervised readings in depth in an area needed by and/or of particular interest to the student. Prerequisite: approval of instructor prior to registration.

Practicum 3 hrs.
Experiences working with children's learning patterns and deviations on an individual and group basis.
650(01) - Early Childhood Education for the Handicapped Practicum (200 clock hours minimum required)
650(02) - Learning Disabilities Practicum (200 clock hours minimum required)
650(03) - Psychometric Practicum (300 clock hours minimum required)
650(04) - Developmental Processes Practicum (200 clock hours minimum required)
650(05) - Early Childhood Learning Practicum (200 clock hours minimum required)
Master's Thesis 3 hrs.
Required of each student who is working on and receiving direction for a thesis. Graduate School requirements for Plans One or Two, as appropriate, must be otherwise met. Prerequisite: departmental approval.
English Department

Professors Francis, Martin (chairman), Welker; Professors Emeriti, Hutchens, Woodard; Associate Professors Moore, Munson; Associate Professor Emerita Harrison; Adjunct Associate Professor James; Assistant Professors Baker, Conover, Davis, Dillard, Goodall, Major, Neff, Roach, Shifreen, Waagen, Webb, Williams; Adjunct Assistant Professors Hughes, McCauley; Instructor Allen; Adjunct Instructors Daugherty, Kaylor.

The Department of English and Communication Arts offers courses leading to the B.A. and M.A. in English, to a minor in English, and to a minor in Communication Arts with options in drama, interpersonal and organizational communication and speech.

English Major

The requirements for a major are 24 to 33 semester hours of upper-division courses in addition to 12 hours of GER in English composition and literature, distributed as follows:

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shakespeare (EH 360) ................................................................. 3</td>
</tr>
<tr>
<td>American literature (EH 330, 331, 430, 431, 432/532, 433/533) .................. 3</td>
</tr>
<tr>
<td>Literature before 1800 (EH 450/550, 451, 460, 461, 470, 471/571, 472/572, 473/573) .... 6</td>
</tr>
<tr>
<td>Literature after 1800 (EH 330, 331, 380, 381, 390, 391, 420/520, 421, 430, 431, 432/532, 433/533, 492, 493, 494/594, 500) .......... 6</td>
</tr>
<tr>
<td>Electives ............................................................................. 6-15</td>
</tr>
<tr>
<td>.................................................................................. 24-33</td>
</tr>
</tbody>
</table>

One course in the novel is required; additional novel courses must be counted as English electives. Six semester hours must be taken in courses numbered 400 or above. Transfer students majoring in English must take at least 12 semester hours of upper division English courses (numbered 300 or above) at UAH. No more than 3 semester hours' credit in creative writing may be applied to an English major or minor without special approval, and no more than 3 hours of American literature may count as literature after 1800.

Any English course deemed appropriate by the adviser may be incorporated into the AOC. AOC's especially for teacher certification are available from faculty advisers.

The English major as defined above will form a part of an area of concentration that must include one of the following variations: (1) A minor drawn from one discipline that includes a minimum of 21 semester hours, 6 hours of which must be numbered 300 or above, (2) a major from another discipline, (3) an area of cognate studies drawn from two or more disciplines that includes a minimum of 21 semester hours, of which 9 hours must be in courses numbered 300 or above.

At the beginning of the sophomore year, the English major should request an adviser for help in planning an AOC as early as possible.
English Minor

A minor in English should include a minimum of 21 semester hours of which at least 3 hours must be taken in courses numbered 400 or above, identified as follows:

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic courses (GER in composition and literature)</td>
<td>12</td>
</tr>
<tr>
<td>Shakespeare (EH 360)</td>
<td>3</td>
</tr>
<tr>
<td>Course numbered 400 or above</td>
<td>3</td>
</tr>
<tr>
<td>Electives in English</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>21</td>
</tr>
</tbody>
</table>

A student with a minor in English must take at least 6 semester hours of advanced English courses (numbered 300 or above) at UAH.

Special programs designed for English majors with an American Studies minor are available from English or American Studies faculty advisers.

English for Second Area of Study

Students majoring in elementary education may select English as their second area of study. For major requirements, see Education section.

To meet university requirements, a minimum of 18 hours, 15 of which must be upper level, are to be selected from courses listed below with the help of the Education faculty adviser and approval by the chairman of the Department of English and Communication Arts. The curriculum may require more than the minimum total of 128 hours for the degree. A typical program is:

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>American literature (EH 330, 331, 430, 431, 432, 433)</td>
<td>3</td>
</tr>
<tr>
<td>Shakespeare (EH 360)</td>
<td>3</td>
</tr>
<tr>
<td>Literature before 1800</td>
<td>3</td>
</tr>
<tr>
<td>Literature after 1800</td>
<td>3</td>
</tr>
<tr>
<td>English Linguistics or History of the English Language (507 or 508)</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>18</td>
</tr>
</tbody>
</table>

Communication Arts Minor

A minor in communication arts must include a minimum of 21 semester hours of which at least 9 hours must be taken in courses numbered 300 or above. The minor incorporates a core of four courses (CM 113, 130, 431, and either 322 or 210), and three additional courses. Broadcasting courses are available through the UAH-A&M Visiting Student Program.

Appropriate communication arts courses may also be used to form part of a program of cognate studies with other disciplines. For example, persons majoring in any of the administrative science disciplines (e.g., accounting, finance, management, marketing, or procurement) may elect courses drawn from those in interpersonal and organization communication to tailor a program combining technical/professional expertise with communication competencies and skills. Persons majoring in any of the humanities (e.g., English,
history, political science, sociology, or psychology) may elect courses drawn from theatre, speech communication, or rhetoric to deepen their understanding of and competencies in situations constituted by communication acts. Persons with career plans in any of the pre-professional study areas (e.g., engineering, nursing, pre-law, pre-medicine, or the natural sciences) may elect coursework specially designed to develop understandings and skills relevant to success in those fields.

**Graduate Program**

The English graduate faculty offers courses in English and American literature to satisfy the requirements for the Master of Arts degree in English. In addition to the Graduate School requirements, the requirements for the M.A. in English are:

1. Eighteen semester hours of graduate work in English, 6 hours of which may be transferred credit approved by the department Graduate Committee.
2. Six additional semester hours of elective graduate courses in English or a related subject approved by the Graduate Committee.
3. At least 50 percent of the hours offered for the degree (exclusive of thesis credit hours) in courses numbered 600 or above and at least 9 hours in English courses at UAH numbered 600 or above (exclusive of thesis credit hours).
4. Master's thesis, required for a minimum of two terms. Upon petition to and approval by the Graduate Committee, a student may substitute 9 hours of graduate English courses for the thesis.
5. A minimum of 30 semester hours. A maximum of 9 semester hours per term is permitted.
6. Oral comprehensive examination on courses taken and on thesis. For students who do not write a thesis, both oral and written examinations are required, and the written examination must be passed before taking the oral examination.
7. A reading knowledge of French, German, Spanish, or another language deemed by the department to be academically appropriate. Adequate reading knowledge must be demonstrated by one of the following options:
   a. Four semesters or their equivalent in one language with a minimum average grade of B at an accredited institution, completed not more than five years before the student's first graduate course in the UAH program.
   b. Intermediate-level performance on a UAH examination in the language, given each term at an announced time. The student must apply through his adviser within two weeks after the announcement of the test date.
   c. A score not lower than the 25th percentile on the Graduate School Foreign Language Test (GSFLT). Registration is necessary 21 days before the examination, and an established fee is required.

A student who plans to pursue the doctoral degree is urged to take this test and pass with a score in the 50th percentile.
8. Additional course work of 3 semester hours of English 507 (English Linguistics) or English 508 (History of the English Language) or a designated course of a similar nature in lieu of the language requirement. This option makes a total of 33 hours required for an M.A. in English and 36 hours required for an M.A. in English with Class A teacher certification.

In addition to these requirements or in lieu of them (as indicated below), a student seeking Class A teacher certification must meet the following requirements:

1. The student must hold or earn before receiving his degree a Class B teacher certificate.
2. The student must take 9 hours of graduate courses in education. These hours replace the thesis requirements; thus, of the 33 semester hours required, 24 are in English and 9 are in education.

Under provisions for strengthened subject matter programs, English courses may be taken instead of education courses if certain requirements have been met at the undergraduate level.

### English (EH)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>003</td>
<td>Basic English</td>
<td>No credit</td>
</tr>
<tr>
<td></td>
<td>Required for students whose placement test score or class performance indicates the need of remedial work.</td>
<td></td>
</tr>
<tr>
<td>099</td>
<td>English as a Second Language-Grammar and Composition Review</td>
<td>No credit</td>
</tr>
<tr>
<td></td>
<td>Review of structural essentials, vocabulary, and stylistic devices used in intermediate level ESL composition. Emphasis will be placed on reviewing and improving students' composition skills through explanation, drill, and practical exercises.</td>
<td></td>
</tr>
<tr>
<td>101</td>
<td>Freshman Composition</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Emphasis on writing, including at least one documented paper related to close critical reading of short stories and the novel. Prerequisite: placement.</td>
<td></td>
</tr>
<tr>
<td>102</td>
<td>Freshman Composition</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Emphasis on theme writing related to close critical reading of poetry and drama. Prerequisite: EH 101.</td>
<td></td>
</tr>
<tr>
<td>103</td>
<td>Advanced Freshman Composition</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Reading literature, especially prose fiction; writing about the way literature treats central humanistic concerns of Western civilization. Prerequisite: placement.</td>
<td></td>
</tr>
<tr>
<td>104</td>
<td>Advanced Freshman Composition</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Reading literature, especially drama and poetry; writing about the way literature treats central humanistic concerns of Western civilization. Prerequisite: EH 103.</td>
<td></td>
</tr>
</tbody>
</table>

Courses below are open to students who have completed EH 102 or 104, with exceptions as indicated.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>205</td>
<td>Survey of English Literature</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Anglo-Saxon period through Milton.</td>
<td></td>
</tr>
<tr>
<td>206</td>
<td>Survey of English Literature</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Restoration through twentieth century.</td>
<td></td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>207</td>
<td>Modern English Grammar</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Structural grammar with review of traditional</td>
<td></td>
</tr>
<tr>
<td></td>
<td>grammar and introduction to transformationalism.</td>
<td></td>
</tr>
<tr>
<td>210</td>
<td>Fiction Writing</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Practice in writing of fiction from conception</td>
<td></td>
</tr>
<tr>
<td></td>
<td>to revision. Prerequisites: EH 206 and approval</td>
<td></td>
</tr>
<tr>
<td></td>
<td>of instructor.</td>
<td></td>
</tr>
<tr>
<td>230</td>
<td>Survey of American Literature</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Survey of writers, genres, and periods from the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Puritans to the present day.</td>
<td></td>
</tr>
<tr>
<td>240</td>
<td>World Literature</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Selected major contributions to Western</td>
<td></td>
</tr>
<tr>
<td></td>
<td>civilization; Homer to the Renaissance.</td>
<td></td>
</tr>
<tr>
<td>241</td>
<td>World Literature</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Selected major contributions to Western</td>
<td></td>
</tr>
<tr>
<td></td>
<td>civilization; Rabelais to the present.</td>
<td></td>
</tr>
<tr>
<td>242</td>
<td>Mythology</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Archetypal, metaphorical, and historical</td>
<td></td>
</tr>
<tr>
<td></td>
<td>significance of deities and myths.</td>
<td></td>
</tr>
<tr>
<td>300</td>
<td>Strategies for Business Writing</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Practical business writing with emphasis on</td>
<td></td>
</tr>
<tr>
<td></td>
<td>rhetoric, organization, and research. Prereq-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>uisites: 6 hours of freshman composition; CM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>113, BIB 230, junior standing; open to all</td>
<td></td>
</tr>
<tr>
<td></td>
<td>students in the School of Administrative Science</td>
<td></td>
</tr>
<tr>
<td></td>
<td>or by permission of the Department of English</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and Communication Arts.</td>
<td></td>
</tr>
<tr>
<td>301</td>
<td>Technical Writing</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Practical writing, especially reports and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>proposals, with emphasis on organization,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>research, and presentation. Prerequisites: 6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>hours of freshman composition and junior</td>
<td></td>
</tr>
<tr>
<td></td>
<td>standing.</td>
<td></td>
</tr>
</tbody>
</table>

Courses below are open to students who have completed the general education requirement in literature, with exceptions as indicated.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>330</td>
<td>Major American Writers</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Major writers from the Colonial period to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Whitman and Melville.</td>
<td></td>
</tr>
<tr>
<td>331</td>
<td>Major American Writers</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Dickinson to Eliot and Faulkner.</td>
<td></td>
</tr>
<tr>
<td>339</td>
<td>Special Studies in American Literature and</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Culture Topics announced in advance. Applicable</td>
<td></td>
</tr>
<tr>
<td></td>
<td>to American Studies minor.</td>
<td></td>
</tr>
<tr>
<td>340</td>
<td>Special Topics in Literature</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Theme, writer, or historical movement to be</td>
<td></td>
</tr>
<tr>
<td></td>
<td>announced in advance.</td>
<td></td>
</tr>
<tr>
<td>345</td>
<td>Special Topics in Film, Literature, and Film</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Theory Offered periodically on varying topics.</td>
<td></td>
</tr>
<tr>
<td>360</td>
<td>Shakespeare</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Renaissance background and at least six plays,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>including history, comedy, and major tragedies.</td>
<td></td>
</tr>
<tr>
<td>380</td>
<td>Restoration and Early Eighteenth Century</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Dryden, Swift, Pope, and others.</td>
<td></td>
</tr>
<tr>
<td>381</td>
<td>Later Eighteenth Century</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Johnson, Boswell, and others.</td>
<td></td>
</tr>
</tbody>
</table>
390 The Romantic Period
Poetry and nonfictional prose, 1780-1832.

391 The Victorian Period
Poetry and nonfictional prose, 1832-1901.

407 English Linguistics
Linguistic analysis of contemporary English, including transformational analysis of English grammar, introduction to English dialect studies, socio- and psycho-linguistic aspects of spoken and written English, and linguistic analysis of prose style. Prerequisite: junior standing.

408 History of the English Language
Diachronic study of the English language from the pre-Anglo-Saxon period to the modern English period. Analysis of the phonological, morphological, syntactic, and semantic changes that have taken place in the language. Historical events that have influenced and effected changes in the language. Prerequisite: junior standing.

420 Modern Poetry
Major movements in American and British poetry of the twentieth century. Prerequisite: junior standing.

421 Modern Drama
New movements in drama from Ibsen to the present.

430 The American Novel
Theme and form of the American novel from Cooper to James.

431 The American Novel
Representative works from the school of naturalism to the present.

432 The Southern Renaissance
Origin and development of Southern myth with emphasis on major writers of the Southern Renaissance. Prerequisite: junior standing.

433 William Faulkner
Critical study of the works of Faulkner, concentrating on his major phase, 1929-42; biography and background.

450 Chaucer
The Canterbury Tales and other major works studied in relation to English and European literary and philosophical traditions. Prerequisite: junior standing.

451 Middle English Literature
The literature of later medieval England, excluding Chaucer, chosen from the Gawain poet, Malory, romance and dream vision, the drama, and the short poem.

460 Sixteenth-Century Poetry and Prose
Wyatt, Sidney, Spenser, and others.

461 Shakespearean Studies
Concentration on one or more themes or genres in the Shakespeare canon, with special attention to the less well-known plays and to the plays as visual productions. Prerequisite: EH 360 recommended.

470 Milton and the Seventeenth Century
Milton's minor poems, selected prose, and Paradise Lost studied with reference to the seventeenth-century context.
471 Sixteenth-Century Drama 3 hrs.
The Elizabethan theatrical tradition from 1500 with emphasis on the plays of Marlowe. Excludes Shakespeare.

472 Seventeenth-Century Poetry 3 hrs.
A study of seventeenth-century poetry, excluding Milton.

473 Seventeenth-Century Drama 3 hrs.
Tragicomedy, baroque tragedy and the heroic play, satiric comedy, Jonson through the Restoration.

492 The English Novel 3 hrs.
Defoe to Jane Austen: critical reading of representative novels accompanied by historical study of the emergence of the genre.

493 The English Novel 3 hrs.
Dickens through Hardy: critical reading of representative novels accompanied by historical survey of major trends.

Major novelists as they attempt to depict reality in response to the post-Darwinian world. Prerequisite: junior standing.

Courses listed below are available to graduate students. Those numbered 500 to 594 have the same basic content as their undergraduate (400-level) counterpart, with the exception that the graduate student is given additional assignments and attention appropriate to a graduate level of study. Courses numbered 600 or above are open only to graduate students.

500 Literary Criticism 3 hrs.
Major theories and methods with application by student. Prerequisite: senior standing.

507 English Linguistics 3 hrs.

508 History of the English Language 3 hrs.

520 Modern Poetry 3 hrs.
Major movements in British and American poetry of the twentieth century.

530 Special Studies in American Literature 3 hrs.
Intensive study of one or more writers, groups, or movements; announced in advance. Prerequisite: junior standing.

532 Southern Renaissance 3 hrs.

533 William Faulkner 3 hrs.

540 Special Studies in English Literature 3 hrs.
Intensive study of one or more writers, groups, movements; announced in advance. Prerequisite: junior standing.

550 Chaucer 3 hrs.

571 Sixteenth-Century Drama 3 hrs.

572 Seventeenth-Century Poetry 3 hrs.

573 Seventeenth-Century Drama 3 hrs.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>594</td>
<td>Studies in the Twentieth-Century Novel</td>
<td>3 hrs</td>
</tr>
<tr>
<td>601</td>
<td>The Idea of the Tragic</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>Study of elements of the tragic in the theater and in the modern novel.</td>
<td></td>
</tr>
<tr>
<td>630</td>
<td>Studies in American Literature to 1865</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>Major movements from Colonial times to 1865; selected major figures or special problems.</td>
<td></td>
</tr>
<tr>
<td>631</td>
<td>Studies in American Literature since 1865</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>Major movements since 1865; selected major figures or special problems.</td>
<td></td>
</tr>
<tr>
<td>639</td>
<td>Special Studies in American Literature</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>Study of one or more writers, genres, groups, or movements; announced in advance.</td>
<td></td>
</tr>
<tr>
<td>649</td>
<td>Special Studies in English Literature</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>Study of one or more writers, genres, groups, or movements; announced in advance.</td>
<td></td>
</tr>
<tr>
<td>651</td>
<td>Studies in the Age of Chaucer</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>Materials selected from Chaucer and from the romance, dream vision, didactic and devotional narrative, short poem, and drama as they relate Chaucer to his age.</td>
<td></td>
</tr>
<tr>
<td>660</td>
<td>Seminar in Shakespeare</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>Emphasis on the &quot;problem&quot; plays and less celebrated tragedies and histories, with special attention to the major criticism, problems of interpretation, and the Elizabethan background.</td>
<td></td>
</tr>
<tr>
<td>665</td>
<td>The Renaissance</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>The period defined in terms of its principal movements, with attention to the major English authors such as More, Wyatt, Sidney, Spenser, and Shakespeare and to selected Italian predecessors, such as Petrarch and Castiglione.</td>
<td></td>
</tr>
<tr>
<td>670</td>
<td>Milton</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>Milton's canon. Development of his thought and art through the early work and the prose, culminating in a study of the three major works, especially <em>Paradise Lost</em>.</td>
<td></td>
</tr>
<tr>
<td>680</td>
<td>Eighteenth-Century Studies</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>Literary life of the century.</td>
<td></td>
</tr>
<tr>
<td>690</td>
<td>Studies in English Romanticism</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>Seminar. Selected poetry and critical prose with attention to aesthetic theory and philosophical and psychological backgrounds.</td>
<td></td>
</tr>
<tr>
<td>691</td>
<td>Studies in the Victorian Period</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>Seminar. Representative writing, both poetry and prose with emphasis on social and cultural changes that inform the literature.</td>
<td></td>
</tr>
<tr>
<td>699</td>
<td>Master's Thesis</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>Required each term a student is working and receiving direction on his master's thesis. Minimum of two terms required, and no more than 6 hours' credit allowed for thesis.</td>
<td></td>
</tr>
</tbody>
</table>

**Communication Arts (CM)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>110</td>
<td>Voice and Diction</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>Introductory course on language, speech, and hearing. Development of individual vocal skills.</td>
<td></td>
</tr>
</tbody>
</table>
113 Basic Speech Communication 3 hrs.
Study and practice of intrapersonal, interpersonal, and public communication skills. Development of communication competence and rhetorical sensitivity. Prerequisite: EH 101.

122 Introduction to Theater 3 hrs.
An introductory survey of theater art, focusing on understanding/appreciation of performance components and genres.

Mass communication theory, history of American mass media, and criticism of contemporary forms and functions of mass communication in the United States. (Same as SOC 130).

131 Survey of Communication Arts Techniques 3 hrs.
Basic understanding of the interrelationships and interdependencies of communication techniques and settings. Prerequisites: CM 113, 130.

201 Journalism I 3 hrs.

202 Journalism II 3 hrs.
Reporting skills in specialized areas of local government, police, courts, and education. Prerequisite: CM 201 or approval of instructor.

210 History of Rhetoric 3 hrs.
An introduction to the history of rhetoric, including the theory and practice of persuasion from ancient Greece and Rome through early psychological rhetorics of the Enlightenment, showing how changes in the history of ideas influence the development of technical and philosophical rhetoric. Prerequisite: CM 113.

214 Oral Interpretation 3 hrs.
Study and practice in intellectual, artistic, and communicative skills required to read prose, poetry, and drama aloud effectively. Participation in a group performance. Prerequisites: CM 110, CM 113, or approval of instructor.

221 Acting 3 hrs.
Fundamentals of acting, including physical, vocal, and intellectual skills. Theory and practice in script analysis, scene study, improvisation, and mime. Prerequisites: CM 110, CM 113, CM 214, or approval of instructor.

240 Communication Arts Practicum 1 hr.
Credit for execution of major responsibility in communication arts activities under faculty supervision. May be repeated up to three times for credit as part of a CM minor. Prerequisite: approval of Communication Arts faculty before registration.

250 Interpersonal Communication 3 hrs.
Development of competency in interpersonal skills, including listening, empathy, conflict resolution, and building and maintaining relationships. Prerequisite: CM 113.

301 News Editing, Headlining, and Layout 3 hrs.
Standard symbols and copy-editing techniques, headline writing and unit counts. Techniques of cover layout and page design. Prerequisite: CM 201 or approval of instructor or both.

310 Persuasion: Theory, Research, and Analysis 3 hrs.
Development and effects of persuasive discourse against the backdrop of American social, political, and intellectual history. Prerequisite: CM 113.

166
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>311</td>
<td>Interviewing: Theory and Technique</td>
<td>3 hrs.</td>
<td>Study and practice of interviewing skills with emphasis on employment interviewing. Prerequisite: CM 113 and junior standing.</td>
</tr>
<tr>
<td>322</td>
<td>Theater History</td>
<td>3 hrs.</td>
<td>Development of theater art from the fifth century B.C. Greeks to today. Internal and external factors affecting theater. Theater as a mirror of society and a means of effecting change. Taught alternate years. Prerequisites: CM 122 and sophomore standing or approval of instructor.</td>
</tr>
<tr>
<td>330</td>
<td>Psychology of Communication</td>
<td>3 hrs.</td>
<td>An intensive study of various theories, problems, and research in the areas of interpersonal, nonverbal, and mass communication, formulating a psychological conception of man as an information-gathering and information-processing system. Prerequisite: CM 113 or approval of instructor. (Same as PY 330).</td>
</tr>
<tr>
<td>340</td>
<td>Special Topics in Communication Arts</td>
<td>3 hrs.</td>
<td>Topics announced in advance. Open to students who have had nine hours in communication arts.</td>
</tr>
<tr>
<td>350</td>
<td>Organizational Communication</td>
<td>3 hrs.</td>
<td>An investigation of the understandings and skills associated with working in corporations and government agencies. Prerequisites: CM 113 and junior standing.</td>
</tr>
<tr>
<td>422</td>
<td>Directing for the Theater</td>
<td>3 hrs.</td>
<td>Artistic and intellectual principles of play direction. Director's processes and responsibilities and the opportunity to put theory into practice. Prerequisites: CM 122 and CM 221 or approval of instructor.</td>
</tr>
<tr>
<td>430</td>
<td>Law of Mass Communication</td>
<td>3 hrs.</td>
<td>Evolution and current status of legal thought and doctrine concerning freedom of expression in speech, print, and broadcasting. Issues of obscenity, censorship, and the &quot;fairness doctrine.&quot; Prerequisite: CM 130 or approval of instructor.</td>
</tr>
<tr>
<td>431</td>
<td>Communication Theory</td>
<td>3 hrs.</td>
<td>A course exploring the history and current developments in theoretical approaches to the study of human communication. Prerequisite: six hours in communication arts.</td>
</tr>
<tr>
<td>450</td>
<td>Administrative Communication</td>
<td>3 hrs.</td>
<td>An exploration of the communicative competencies and processes associated with executive behavior. Prerequisites: CM 113 and CM 350 or MGT 361.</td>
</tr>
<tr>
<td>636</td>
<td>Effective Communication for Managers</td>
<td>3 hrs.</td>
<td>Examination of techniques for effective interpersonal, group, and presentational communication applied to everyday situations faced by managers. Prerequisite: Graduate standing.</td>
</tr>
</tbody>
</table>
Foreign Languages and Literatures Department
Professors Penot, Wilson; Associate Professor O'Neal; Associate Professor Emerita Heller; Assistant Professors Goebel, Stromecky (chairman), Traylor.

French, German, Russian, Spanish
Acquisition of a second language, and through it an understanding of another culture, is not only a personally enriching experience, it is also, today, a valuable and salable commodity.

The language programs are designed to enable effective use of modern foreign language, both oral and written, in social, business, and professional life.

The department offers both a major and minor program in French (FH) and German (GN), and a minor in Russian (RN) and Spanish (SH). In addition, the department directs the Slavic Area Studies Program.

General Education Requirements
Twelve semester hours of credit in one foreign language are required for the B.A. or B.S. degrees unless the student can demonstrate by CLEP examination a competence at a level more advanced than the beginning 101 course. For example:

<table>
<thead>
<tr>
<th>Placement Levels</th>
<th>Hours Required</th>
<th>Courses Students Must Take in One Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>101 course (1st level)</td>
<td>12 hours</td>
<td>101, 102, 201, 202</td>
</tr>
<tr>
<td>102 course (2nd level)</td>
<td>9 hours</td>
<td>102, 201, 202</td>
</tr>
<tr>
<td>201 course (3rd level)</td>
<td>6 hours</td>
<td>201, 202</td>
</tr>
<tr>
<td>202 course (4th level)</td>
<td>6 hours</td>
<td>202 and one upper level course</td>
</tr>
</tbody>
</table>

Students with Previous Language Training
A student who has had formal training in a foreign language will be placed on the level of that language according to the number of units and grades earned in high school or will take the CLEP examination in the language, the score of which will determine the placement. By taking the CLEP, a student may receive credit hours with no quality points, depending on placement level and score.* Native or quasi-native speakers must take departmental level examinations and may earn up to 15 hours credit.

The Department of Foreign Languages and Literatures reserves the right to limit the amount of credit obtained by means other than enrollment in a class which may be credited towards a major or supporting minor.

*See Advanced Placement section.

Program of Studies
A foreign language major consists of 24 semester hours above the basic course sequence in a single language. Students beginning the language on the 101 level must take a total of 36 semester hours.
A foreign language minor consists of 12 semester hours above the basic-course sequence in a single language. Students beginning the language on the 101 level must take a total of 24 semester hours. Advanced conversation, ad-
vanced grammar and composition, and the introduction to literature courses are required. An additional course on the 300 level complete the requirement for the minor.

**Area of Concentration (AOC) with French Major**
- Required courses: FH 300, 303, 304 and three courses on the 400 level and two electives from either the 300 or 400 level.

**Area of Concentration (AOC) with German Major**
- Required courses: GN 300, 311, 312 and three courses on the 400 level and two electives from either 300 or 400 level.

**Area of Concentration (AOC) with Slavic Area Studies Major**
- The Slavic Area Studies Program is an enrichment program as well as one to prepare students for careers in government, industry, international commerce and trade, and other related areas of work, while providing the necessary preparation for further study on the graduate level.

  Drawing from four disciplines, foreign languages and literatures, history, political science, and economics, the program places emphasis on Russian (language, literature, and culture) and history, with strong supporting work in political science and economics.

  Slavic area studies, through a controlled program of study, offers the student intensive training aimed at the development of competency in more than one area.

**Requirements for the Slavic Area Studies Program are:**

- **Russian** .......................................................... 101, 102, 201, 202, 300, 331, 332, 335 and two of the 400-level courses
- **History** ............................................................ 101, 102, 375, 376, 590, and three selections approved by the History and Philosophy Department chairman
- **Political Science** ............................................... 101, 246, 336, or 337
- **Economics** ...................................................... 300, 400, 585 (two of these courses required)

  The student is advised to choose elective courses that will strengthen the major areas or develop ancillary proficiency.

  Student adviser for the program is the chairman of the Foreign Languages and Literatures Department, who also chairs the Slavic Area Studies Committee, composed of representatives from the participating disciplines.

**Foreign Languages International Trade**
- The FLL Department, in conjunction with the School of Administrative Science, offers a curriculum containing foreign language and business courses which lead to a composite major with emphasis in Foreign Language for International Trade. Such a major opens up a broad variety of career opportunities in the multinational and multilingual business world of today.
Courses required in this major are as follows:

<table>
<thead>
<tr>
<th>Business courses:</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC 211 Principles of Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>AC 221 Accounting Lab I</td>
<td>0</td>
</tr>
<tr>
<td>AC 212 Principles of Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>AC 222 Accounting Lab II</td>
<td>0</td>
</tr>
<tr>
<td>BLS 221 Business Law I</td>
<td>3</td>
</tr>
<tr>
<td>FIN 301 Principles of Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGT 301 Principles of Management</td>
<td>3</td>
</tr>
<tr>
<td>MKT 301 Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>AC 450 Studies in International Accounting</td>
<td>3</td>
</tr>
<tr>
<td>EC 546 International Economics and Trade</td>
<td>3</td>
</tr>
<tr>
<td>FIN 554 International Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGT 520 International Management</td>
<td>3</td>
</tr>
<tr>
<td>MKT 515 International Marketing</td>
<td>3</td>
</tr>
</tbody>
</table>

Principles of Accounting I .................................. 3
Accounting Lab I ........................................ 0
Principles of Accounting II ................................. 3
Accounting Lab II ........................................ 0
Business Law I ........................................... 3
Principles of Finance ...................................... 3
Principles of Management .................. 3
Principles of Marketing .................. 3
International Finance ................................. 3
Studies in International Accounting ........ 3
International Economics and Trade ........ 3
International Finance .................. 3
International Management .................. 3
International Marketing .................. 3

Three of these five 9

Foreign Language courses

| FLL 101, 102 or 103, 104 Elementary FLL (French, German, Russian, or Spanish) | 12 |
| FLL 201, 202 or 203 Intermediate FLL (French, German, Russian, or Spanish) | 3 |
| FLL 3-- Advanced Conversation | 3 |
| FLL 3-- Advanced Composition | 3 |
| FLL 3-- -- Culture | 3 |
| FLL 3-- Introduction to Literature | 3 |
| FLL 3-- Business and Professions | 3 |
| FLL 4-- Practicum | 3 |
| FLL 4-- Elective | 3 |
| FLL 4-- Elective | 3 |

Area of Concentration (AOC) Models

A student majoring in a foreign language will find a variety of AOC's which enable him to develop depth and breadth in the major and related areas: other languages, humanities, social and behavioral sciences, mathematics, engineering, natural sciences, and elementary education. Model AOC's are available in the Foreign Languages and Literatures office. A student who wishes to plan his own AOC should do so in consultation with a member of the particular language faculty.

Minor

An AOC requires a minor (see definition and regulations elsewhere in catalog). Possible minors for foreign language majors are available in the Foreign Languages and Literatures Office. See program of studies for foreign language in minor.
French for Second Area of Study
A student majoring in elementary education may select French as a second area of study. See Education section for major requirements.
To meet university requirements, a minimum of 18 hours, 15 of which must be upper level, are to be selected from courses listed below with the help of the French faculty adviser and approved by the chairman of the Department of Foreign Languages and Literatures. This curriculum may require more than the minimum total of 128 hours for the degree.

German for Second Area of Study
A student majoring in elementary education may select German as a second area of study. See Education section for major requirements.
To meet university requirements, a minimum of 18 hours, 15 of which must be upper level, are to be selected from courses listed below with the help of the German faculty adviser and approved by the chairman of the Department of Foreign Languages and Literatures. This curriculum may require more than the minimum total of 128 hours for the degree.

Modern Language (ML) Courses
Courses coded under ML are language-related courses taught in English. Therefore such courses cannot count towards either major or minor requirements for degree purposes.

Modern Languages (ML)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Elementary Latin</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>319</td>
<td>German Masterpieces in English Translation</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>333</td>
<td>Russian Masterpieces in English Translation</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>400</td>
<td>Intermediate English as a Foreign Language</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>410</td>
<td>Advanced English as a Foreign Language</td>
<td>3 hrs.</td>
</tr>
</tbody>
</table>

French (FH)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Elementary French</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>Course</td>
<td>Credits</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------</td>
<td>---------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>102 Elementary French</td>
<td>3 hrs.</td>
<td>Lab fee: Level 2. Prerequisite: FH 101 or placement.</td>
</tr>
<tr>
<td>104 Introductory French II</td>
<td>4 hrs.</td>
<td>Continuation of French 103. Lab fee: Level 2. Prerequisite: FH 103 or approval of instructor.</td>
</tr>
<tr>
<td>201 Intermediate French</td>
<td>3 hrs.</td>
<td>Lab fee: Level 2. Prerequisite: FH 102 or placement.</td>
</tr>
<tr>
<td>202 Intermediate French</td>
<td>3 hrs.</td>
<td>Prerequisite: FH 201 or placement.</td>
</tr>
<tr>
<td>203 Introductory French III</td>
<td>4 hrs.</td>
<td>Continuation of Level II with increased emphasis on culture. Prerequisite: FH 104 or approval of instructor.</td>
</tr>
<tr>
<td>300 Introduction to French Literature</td>
<td>3 hrs.</td>
<td>Major movements and works from the beginning to the present. Prerequisite: FH 202 or approval of instructor.</td>
</tr>
<tr>
<td>304 Advanced French Composition</td>
<td>3 hrs.</td>
<td>Composition with emphasis on grammar review and idiomatic expression. Prerequisite: FH 202, 203, or approval of instructor.</td>
</tr>
<tr>
<td>307 French Culture</td>
<td>3 hrs.</td>
<td>Contrastive cultural patterns of French-speaking peoples: their cause and effect. Prerequisite: FH 202 or approval of instructor.</td>
</tr>
<tr>
<td>310 French for Business and Professions</td>
<td>3 hrs.</td>
<td>The reading and translation of (two-way) materials, documents, and forms pertinent to commerce and professions. Individualized instruction. Prerequisite: FH 202 or approval of instructor.</td>
</tr>
<tr>
<td>403 Sixteenth Century French Literature</td>
<td>3 hrs.</td>
<td>Intellectual, philosophical, and aesthetic trends and developments in Renaissance France, using representative works of the period. Prerequisite: FH 300 or approval of instructor.</td>
</tr>
<tr>
<td>404 Seventeenth Century French Literature</td>
<td>3 hrs.</td>
<td>Masterpieces of the period with emphasis on the theater of Corneille, Racine, and Moliere. Prerequisite: FH 300 or approval of instructor.</td>
</tr>
<tr>
<td>405 Eighteenth Century French Literature</td>
<td>3 hrs.</td>
<td>French thought and writing in this important century. Representative works from Voltaire to Chenier. Prerequisite: FH 300 or approval of instructor.</td>
</tr>
<tr>
<td>406 Nineteenth Century French Novel</td>
<td>3 hrs.</td>
<td>Principal novelists of the nineteenth century: Balzac, Stendahl, Flaubert, Zola. Prerequisite: FH 300 or approval of instructor.</td>
</tr>
</tbody>
</table>
French Drama
The most influential French dramatists from the nineteenth century to the present. Prerequisite: FH 300 or approval of instructor.

Twentieth Century French Novel
The most influential French novelists from the beginning of the century to the present from Proust to Claude Simon. Prerequisite: FH 300 or approval of instructor.

Practicum
Interpretation (simultaneous translation) and oral presentations, using the laboratory, guests (native speakers), periodicals, brochures, etc. Recommended as a companion course for FH 310. Individualized instruction. Prerequisite: FH 310 or approval of instructor.

Independent Studies
Prerequisite: approval of department chairman.

German (GN)

Elementary German I
Lab fee: Level 2.

Elementary German II
Lab fee: Level 2. Prerequisite: GN 101 or placement.

Introductory German - Level I
A new teaching method known as the Dartmouth Intensive Language Model which emphasizes oral comprehensive, speaking, reading, and cultural training. Lab fee: Level 2.

Introductory German - Level II
Continuation of German 103. Lab fee: Level 2. Prerequisite: GN 103 or approval of instructor.

Intermediate German I
Lab fee: Level 2. Prerequisite: GN 102 or placement.

Intermediate German II
Prerequisite: GN 201 or placement.

Introductory German - Level III
Continuation of German 104. Prerequisite: GN 104 or approval of instructor.

Introduction to German Literature
Major movements and works from the beginning to the present. Prerequisite: GN 202 or approval of instructor.

German Conversation
Oral practice, communication and reports, emphasizing topics of daily experiences, travels, and contemporary German life. Prerequisite: GN 202 or approval of instructor.

Advanced German Composition and Usage
Composition with emphasis on grammar review and idiomatic expression. Prerequisite: GN 202 or approval of instructor.

Development and Structure of the German Language
Linguistic development of the German language, with emphasis on the structure of Modern High German. Contrastive analysis of the phonological, grammatical and semantic structures of Modern High German and Standard American English. Prerequisite: GN 311 or GN 312.
316 German Culture 3 hrs.
Contrastive American and German cultural patterns: their cause and effect. Prerequisite: GN 202 or approval of instructor.

318 German for Business and Professions 3 hrs.
Read and translate (two-way) materials, documents, and forms pertinent to commerce and the professions. Individualized instruction. Prerequisite: GN 202 or approval of instructor.

412 Goethe, Schiller and Major Writers of Eighteenth Century 3 hrs.
Contributions of Goethe and Schiller to German literature compared with significant works by contemporary writers of the eighteenth century: Lessing, Gellert, Klopstock, Herder, Wieland, Lenz, et al. Prerequisite: GN 300 or approval of instructor.

413 German Romanticism 3 hrs.
German literature of the romantic period, its philosophy and theory. Prerequisite: GN 300 or approval of instructor.

414 The German "Novelle" from Goethe to Kafka 3 hrs.
Important literary genre using representative novellas of the nineteenth century. Prerequisite: GN 300 or approval of instructor.

416 Twentieth Century German Literature 3 hrs.
Writers and works of the early twentieth century with emphasis on post-war German literature, short stories, and novels. Prerequisite: GN 300 or approval of instructor.

418 Modern German Drama 3 hrs.
German drama from the nineteenth century to present showing development and diversity of modern German drama. Prerequisite: GN 300 or approval of instructor.

419 German Lyric Poetry 3 hrs.
Interpretation of selected masterpieces of major German poets from the eighteenth to the twentieth century. Prerequisite: GN 300 or approval of instructor.

420 Goethe's Faust 3 hrs.
Goethe's drama in the context of German and European literary tradition. Prerequisite: GN 300 or approval of instructor.

425 Practicum 3 hrs.
Interpretation (simultaneous translation) and oral presentations, using laboratory, guests (native speakers), periodicals, brochures, etc. Highly recommended as a companion course for GN 318. Individualized instruction. Prerequisite: GN 318 or approval of instructor.

499 Independent Studies 1-3 hrs.
Prerequisite: approval of department chairman.

Russian (RN)

101 Elementary Russian 3 hrs.
Lab fee: Level 2.

102 Elementary Russian 3 hrs.
Lab fee: Level 2. Prerequisite: RN 101 or placement.

201 Intermediate Russian 3 hrs.
Lab fee: Level 2. Prerequisite: RN 102 or placement.
202 Intermediate Russian
Prerequisite: RN 201 or placement.
3 hrs.

234 Intermediate Scientific Russian
Prerequisite: RN 201 or permission of the instructor.
3 hrs.

300 Introduction to Russian Literature
Major movements and works from the beginning to the present. Prerequisite: RN 202 or approval of instructor.
3 hrs.

331 Russian Conversation
Prerequisite: RN 202 or approval of instructor.
3 hrs.

332 Advanced Grammar and Composition
Prerequisite: RN 202 or approval of instructor.
3 hrs.

335 Russian Culture
Contrastive American and Russian cultural patterns: their cause and effect. Prerequisite: RN 202 or approval of instructor.
3 hrs.

339 Russian Poetry
Russian verse from its beginning to Pushkin. An examination of Russian literary-poetic language, with consideration of the role of Church Slavonic, regional dialects, and foreign influences as well as the contribution of particular authors. Prerequisite: RN 202.
3 hrs.

340 Russian for Business and Professions
The reading and translation of (two-way) materials, documents, and forms pertinent to commerce and the professions. Individualized instruction. Prerequisite: RN 202 or approval of instructor.
3 hrs.

433 Major Writers of the Nineteenth Century
Representative works from Pushkin through Chekhov. Prerequisite: RN 300 or approval of instructor.
3 hrs.

439 Gogol
Gogol's major works, especially Dead Souls. Style, ideology, and literary technique of the author. Prerequisite: RN 300 or approval of instructor.
3 hrs.

440 Dostoevsky
Major works by Dostoevsky, regarding style, ideology, philosophies, and technique. Prerequisite: RN 300 or approval of instructor.
3 hrs.

441 Practicum
Interpretation (simultaneous translation) and oral presentations, using the laboratory, guests (native speakers), periodicals, brochures, etc. Recommended as a companion course for RN 340. Individualized instruction. Prerequisite: RN 340 or approval of instructor.
3 hrs.

499 Independent Studies
Prerequisite: approval of department chairman.
1-3 hrs.

175
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Elementary Spanish</td>
<td>3 hrs.</td>
<td>Lab fee: Level 2. Prerequisite: SH 102 or placement.</td>
</tr>
<tr>
<td>102</td>
<td>Elementary Spanish</td>
<td>3 hrs.</td>
<td>Lab fee: Level 2. Prerequisite: SH 101 or placement.</td>
</tr>
<tr>
<td>201</td>
<td>Intermediate Spanish</td>
<td>3 hrs.</td>
<td>Lab fee: Level 2. Prerequisite: SH 102 or placement.</td>
</tr>
<tr>
<td>202</td>
<td>Intermediate Spanish</td>
<td>3 hrs.</td>
<td>Prerequisite: SH 201 or placement.</td>
</tr>
<tr>
<td>300</td>
<td>Introduction to Spanish Literature</td>
<td>3 hrs.</td>
<td>Major movements and works from the beginning to the present. Prerequisite: SH 202 or approval of instructor.</td>
</tr>
<tr>
<td>320</td>
<td>Hispanic Culture</td>
<td>3 hrs.</td>
<td>Contrastive Hispanic and American cultural patterns; their cause and effect. Prerequisite: SH 202 or approval of instructor.</td>
</tr>
<tr>
<td>323</td>
<td>Spanish Conversation and Pronunciation</td>
<td>3 hrs.</td>
<td>Prerequisite: SH 202 or approval of instructor.</td>
</tr>
<tr>
<td>324</td>
<td>Advanced Spanish Grammar and Composition</td>
<td>3 hrs.</td>
<td>Recommended for teachers. Prerequisite: SH 202 or approval of instructor.</td>
</tr>
<tr>
<td>327</td>
<td>Spanish for Business and Professions</td>
<td>3 hrs.</td>
<td>The reading and translation of (two-way) materials, documents, and forms pertinent to commerce and the professions. Individualized instruction. Prerequisite: SH 202 or approval of instructor.</td>
</tr>
<tr>
<td>420</td>
<td>Practicum</td>
<td>3 hrs.</td>
<td>Interpretation (simultaneous translation) and oral presentations, using the laboratory, guests (native speakers), periodicals, brochures, etc. Recommended as a companion course for SH 327. Individualized instruction. Prerequisite: SH 327 or approval of instructor.</td>
</tr>
<tr>
<td>423</td>
<td>Cervantes: Don Quixote</td>
<td>3 hrs.</td>
<td>Diverse interpretations of this famous novel and its transcendency as a work. Prerequisite: SH 300 or approval of instructor.</td>
</tr>
<tr>
<td>424</td>
<td>Golden Age Drama</td>
<td>3 hrs.</td>
<td>Drama of the sixteenth and seventeenth centuries, with emphasis on the major dramatists: Lope de Vega, Tirso, and Calderon. Representative works. Prerequisite: SH 300 or approval of instructor.</td>
</tr>
<tr>
<td>427</td>
<td>Spanish American Novel</td>
<td>3 hrs.</td>
<td>Representative novels of the modern period, which reflect the cultural, economic, political and social concerns of the Spanish-American republics, nationally and internationally. Prerequisite: SH 300 or approval of instructor.</td>
</tr>
<tr>
<td>429</td>
<td>The Generation of '98</td>
<td>3 hrs.</td>
<td>Literary and philosophical works representative of this important group of Spanish writers. Emphasis on Miguel de Unamuno. Prerequisite: SH 300 or approval of instructor.</td>
</tr>
<tr>
<td>499</td>
<td>Independent Studies</td>
<td>1-3 hrs.</td>
<td>Prerequisite: approval of department chairman.</td>
</tr>
</tbody>
</table>
Linguistics Offerings

Linguistics is the systematic study of language structure and usage for language systems in general. It includes such concerns as examination of the patterns of sounds, grammatical structure, and the way patterns of meaning are communicated (the study of semantics), as well as language differences from region to region or among people of different background, profession, or personal style.

Linguistics course offerings do not constitute a minor.

Linguistics (LI)

100 Language, Mind, and Society 3 hrs.
Major language phenomena, including implications for the individual, as well as social and historical factors in language structure and change. Language families of the world, regional and social differences in language use, language learning, and relationships to thought and culture.

101 Introduction to Linguistic Analysis 3 hrs.
Introduction to technical and theoretical linguistics. Phonology, morphology, historical linguistics, theories of grammar, syntax, and semantics. Practical work in analyzing language data and writing a grammar at conclusion of course.

320 General Comparative Linguistics 3 hrs.
Comparison of phonological, grammatical, and syntactic systems of modern foreign languages with structures of modern English. Construction of a contrastive analysis. Prerequisite: FL 202 or EH 200 or LI 100, 101.

321 Applied Linguistics (TESL) 3 hrs.
Methods of determining and describing the differences in the linguistic structures of foreign languages and English, and the construction of a contrastive analysis. Methods and materials used in the teaching of English to native speakers of other languages. Prerequisite: Any one of the following: LI 101, LI 320, EH 207, EH 407, or permission of the instructor.
Health, Physical Education and Recreation Program
Director: Dr. Joe Manjone

Health and Physical Education Offerings
Fitness, active participation, and good health habits are essential in modern society. Through a variety of health and physical education activity courses, (HPE 100 through 179) the student can increase fitness, learn skills for a lifetime of participation, and gain a conceptual knowledge of health practices and skills.

These activity courses carry 1 semester hour of credit with no more than 6 hours counting toward graduation. Courses may not be repeated for credit. Grades of satisfactory or unsatisfactory are given, based primarily on a student's improvement in skill rather than on the level of ability or knowledge brought to the course. A participant in a varsity sport may not enroll in a regular activity course in that sport.

Because of demonstrated community need, a number of courses that provide professional training in aspects of Health and Physical Education and related fields are offered in the HPER program. Many of these courses meet certification standards with certificates awarded upon completion. They require both skill and academic training. Normal letter-grade system and other academic standards apply to them.

Recreation Offerings
A major trend in society is the increase in leisure time and recreational participation. Because of this trend, the recreation industry is growing at a tremendous rate. This growth has created a demand for trained recreation professionals. In response to this trend, the HPER program offers a number of recreation courses.

Health and Physical Education (HPE)
Activity Courses
100 Physical Fitness 1 hr.
101 Slimnastics 1 hr.
102 Aerobic Dance 1 hr.
103 Jogging for Fitness and Weight Control 1 hr.
104 Beginning Weight Training 1 hr.
105 Beginning Self-Defense 1 hr.
106 Folk and Square Dance 1 hr.
107 Beginning Stunts and Tumbling 1 hr.
110 Beginning Swimming; Lab fee: Level 1 1 hr.
111 Swimmastics; Lab fee: Level 1 1 hr.
112 Basic Canoeing; Lab fee: Level 1 1 hr.
115 Badminton; Lab fee: Level 1 1 hr.
116 Racquetball; Lab fee: Level 1 1 hr.
117 Beginning Tennis; Lab fee: Level 1 1 hr.
118 Handball; Lab fee: Level 1 1 hr.
120 Archery; Lab fee: Level 3 1 hr.
121 Ice Skating; Lab fee: Level 4 1 hr.
123 Frisbee 1 hr.
124 Backpacking; Lab fee: Level 2 1 hr.
125 Basic Horseback Riding; Lab fee: Level 10 (all-weather indoor arena available.) 1 hr.
126 Beginning Golf; Lab fee: Level 3 1 hr.
127 Beginning Bowling; Lab fee: Level 3 1 hr.
128 Basic Bridge 1 hr.
129 Snow Skiing; Lab fee: Level 7 1 hr.
130 Basketball; Lab fee: Level 1 1 hr.
131 Volleyball; Lab fee: Level 1 1 hr.
132 Softball; Lab fee: Level 1 1 hr.
133 Soccer; Lab fee: Level 1 1 hr.
134 Ice Hockey Instruction; Lab fee: Level 4 1 hr.
135 Sport Parachuting 1 hr.
138 Intermediate Ice Hockey; Lab fee: Level 4 1 hr.
139 Intermediate Folk and Square Dance (Clogging) 1 hr.
140 Intermediate Ice-Skating; Lab fee: Level 4 1 hr.
141 Intermediate Swimming; Lab fee: Level 1 1 hr.
142 Intermediate Self-Defense 1 hr.
143 Intermediate Tennis; Lab fee: Level 3 1 hr.
144 Intermediate Racquetball; Lab fee: Level 1 1 hr.
145 Intermediate Bridge 1 hr.
146 Intermediate Stunts and Tumbling; Lab fee: Level 1 1 hr.
147 Intermediate Golf; Lab fee: Level 3 1 hr.
148 Intermediate Frisbee 1 hr.
149 Intermediate Aerobic Dance 1 hr.
150 Advanced Lifesaving; Lab fee: Level 1 1 hr.
151 Advanced Tennis; Lab fee: Level 1 1 hr.
152 Advanced Self-Defense 1 hr.
153 Advanced Slimnastics 1 hr.
154 Advanced Racquetball; Lab fee: Level 1 1 hr.
155 Advanced Frisbee 1 hr.
156 Advanced Weight Training 1 hr.
157 Advanced Bowling; Lab fee: Level 3 1 hr.
158 Advanced Ice-Skating; Lab fee: Level 4 1 hr.
159 Advanced Aerobic Dance 1 hr.
160 Power Weight Lifting 1 hr.
161 Water-Safety Instruction 1 hr.
162 Horseback Riding II - Field Riding; Lab fee: Level 10 1 hr.
163 Equestrian Studies; Lab fee: Level 6 1 hr.
164 Advanced Ice Hockey; Lab fee: Level 4 1 hr.
170 Varsity Sports - Basketball 1 hr.
171 Varsity Sports - Soccer 1 hr.
172 Varsity Sports - Crew 1 hr.
173 Varsity Sports - Tennis 1 hr.
174 Varsity Sports - Ice Hockey 1 hr.

Professional Courses
180 History and Principles of Physical Education 3 hrs.
185 Coaching Ice Hockey 1 hr.
Students analyze the mechanics of movement, evaluate strategies, study player-coach relationships, and experience the positive effects of both exercise and competition. Prerequisite: Instructor approval. Lab Fee Level 4.
CPR Instructor 1 hr.
Twenty-five hours of comprehensive techniques in the basics and instruction of cardio-pulmonary resuscitation. Upon successful completion of the course, student is certified as a CPR Instructor.

Emergency Medical Technician-Basic 3 hrs.
Basic techniques of pre-hospital stabilization in such emergency situations as traumatic injuries, cardiac arrest, and other life-threatening health conditions. (Same as MED 191).

Emergency Medical Technician-Basic Lab 1 hr.
Laboratory course concurrent with MED/HPE 191. Application of techniques taught in MED/HPE 191 to real and simulated situations. Successful completion of the lecture and laboratory course qualifies student for exam for Alabama EMT-Basic License. Prerequisite: MED/HPE 191 or concurrent enrollment. (Same as MED 192).

Contemporary Medicine and the Young Adult 3 hrs.
Contemporary health systems in the U.S., their various components, and their functional relationships to one another. Common individual health problems significant to young adults and ways in which these problems are manifested clinically, and what constitutes appropriate management.

Contemporary Nutrition for Today's Lifestyle 1 hr.
Broad spectrum of nutritional topics. Nutritional philosophy, health hazards, dietary regimes.

Basketball Officiating 2 hrs.
Techniques, mechanics, and rules involved in officiating basketball for certification as an Alabama high school official. Experience and skill necessary to officiate basketball on elementary, secondary, and recreational levels.

Football Officiating 2 hrs.
Techniques, mechanics, and rules involved in officiating football for certification as an Alabama high school official. Experience and skills necessary to officiate football on elementary, secondary, and recreational levels.

Baseball and Softball Officiating 2 hrs.
Baseball and softball officiating techniques, mechanics, and rules for certification as an Alabama high school baseball official and an Amateur Softball Association umpire. Experience and skills necessary to officiate baseball and softball on various interscholastic and recreational levels.

Soccer Officiating 2 hrs.
Techniques, mechanics, and rules involved in the officiating of soccer. Experience and skills necessary to officiate soccer on elementary, secondary, and recreational levels.

Scuba 2 hrs.
Basic skills, theories, techniques, and fundamentals of scuba-diving introduced, practiced, and refined. Open water diving. Scuba certification upon successful completion of course. Prerequisite: approval of instructor. Lab fee: Level 5.

Private Pilot Ground School 3 hrs.
Prepares student for FAA Private Pilot written exam. Provides student with necessary knowledge to progress into primary pilot flight training.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
<th>Description</th>
<th>Prerequisites/Approval Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>270</td>
<td>Private Pilot Instruction I</td>
<td>1 hrs.</td>
<td>Prepares student for solo flight. Includes 12 hours of dual flight instruction and 8 hours of ground instruction. Prerequisite: HPE 269 or approval of instructor. Lab fee: Level 11.</td>
<td></td>
</tr>
<tr>
<td>271</td>
<td>Private Pilot Instruction II</td>
<td>1 hrs.</td>
<td>Includes dual, solo and ground instruction. Prepares student for FAA Private Pilot certificate. Prerequisites: HPE 269 and 270, or instructor approval. Lab fee: Level 12.</td>
<td></td>
</tr>
<tr>
<td>272</td>
<td>Private Pilot Instruction III</td>
<td>1 hrs.</td>
<td>Includes dual and solo flight instruction, and flight critiques. Upon completion of this and other Private Pilot sequence courses, student is prepared to take FAA Private Pilot exam. Prerequisites: HPE 269, 270 and 271 or instructor approval. Lab fee: Level 13.</td>
<td></td>
</tr>
<tr>
<td>290</td>
<td>Care and Prevention of Athletic Injuries</td>
<td>3 hrs.</td>
<td>Provides working knowledge of the care and prevention of athletic injuries. For teachers, coaches, athletes, parents and those working in recreation, physical education, or athletics. Trainer certification awarded upon successful completion. Lab fee: Level 6.</td>
<td></td>
</tr>
</tbody>
</table>

**Recreation (REC)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
<th>Description</th>
<th>Prerequisites/Approval Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Introduction to Leisure Services</td>
<td>3 hrs.</td>
<td>History, theory, and philosophy of recreation. Principles and practices related to leisure programming in city, county, and state, federal, private, and commercial agencies. Job descriptions and career opportunities.</td>
<td></td>
</tr>
<tr>
<td>201</td>
<td>Leisure Services Leadership and Supervision</td>
<td>3 hrs.</td>
<td>Processes and techniques of leadership and supervision related to leisure services. Delineation and differences between group action and individualized decision-making. Supervisory experience.</td>
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</tr>
<tr>
<td>203</td>
<td>Introduction to Therapeutic Recreation</td>
<td>3 hrs.</td>
<td>Methods and techniques employed in serving special populations with individual and group leisure opportunities. Theoretical in-class and out-of-class applications. Requirement: 40 hours of work experience in a therapeutic setting.</td>
<td></td>
</tr>
<tr>
<td>290</td>
<td>Field Work in Leisure Services</td>
<td>2 hrs.</td>
<td>Planned supervised 80-hour work experience with a leisure service agency. Written reports, a major project, and final oral report required.</td>
<td></td>
</tr>
<tr>
<td>301</td>
<td>Planning Leisure Service Programs</td>
<td>3 hrs.</td>
<td>Theories, principles, policies, and procedures for organizing, directing, and conducting leisure service programs. Development of programs in various activity areas. Prerequisites: REC 100, 201, 203, and 290 or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>303</td>
<td>Adaptive Activities</td>
<td>3 hrs.</td>
<td>Leisure activities suitable for handicapped populations in all age groups and at skill levels. Modification of activities to make them appropriate. Development of activities and their use in working with handicapped clients.</td>
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</tr>
<tr>
<td>312</td>
<td>Outdoor Education</td>
<td>3 hrs.</td>
<td>Administration procedures and organizational concepts of camps and outdoor schools. Techniques for utilizing outdoors for classrooms in various disciplines. Outdoor skills and outdoor school experience. Open to all students, especially education majors.</td>
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</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
<td></td>
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<tr>
<td>321</td>
<td>Military Recreation</td>
<td>3 hrs.</td>
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<td></td>
<td>Leisure services offered by branches of the military. Divisions within military recreation agencies distinguished and studied. Rules and regulations, military budgeting, and career opportunities. Inclusion of 40 hours of field experience in a military recreation setting.</td>
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<tr>
<td>331</td>
<td>European Recreation Study Tour</td>
<td>6 hrs.</td>
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<td></td>
<td>A study tour of major European recreation, park, sports, and tourist facilities. Student examines selected recreation facilities and programs in West Germany, Switzerland, Austria and Italy compares these with facilities and programs in the United States. The role of tourism in the total development of European recreation is emphasized. Lab fee extra.</td>
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<tr>
<td>341</td>
<td>Campus Recreation</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Campus recreation-programming and administration. Tournament organization and scheduling. Forty hours of work experience in campus recreation programs.</td>
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<tr>
<td>399</td>
<td>Special Topics</td>
<td>1-3 hrs.</td>
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<tr>
<td></td>
<td>Nontraditional Recreation Topics. Title of course and number of credit hours will appear in course schedule along with any prerequisites. Course may be taken more than once as long as topics differ.</td>
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<tr>
<td>401</td>
<td>Fitness, Activity and Health</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>The effects of fitness resulting from various leisure activities; proper diet and health habits are identified and studied. Assessment tools to determine these effects and programs to improve fitness are explored. Lifestyle changes through proper leisure activities, health habits, and nutrition are emphasized.</td>
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<tr>
<td>450</td>
<td>Administration of Leisure Services and Facilities</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Philosophy, principles, problems, policies and procedures associated with the delivery of leisure services are examined. Facility planning, design and administration is emphasized. Prerequisite: REC 301.</td>
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<tr>
<td>490</td>
<td>Internship in Leisure Services</td>
<td>10 hrs.</td>
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<tr>
<td></td>
<td>A minimum of 400 hours practical, planned work experience in a leisure service agency under the direction of a recreation professional and the UAH intern coordinator. Internship must be appropriate for the selected option. Internship must be approved at least one term in advance. Prerequisite: REC 301, senior standing or approval of instructor.</td>
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<tr>
<td>500</td>
<td>Boating Safety Instructor</td>
<td>3 hrs.</td>
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</tr>
<tr>
<td></td>
<td>Techniques for teaching boating safety to elementary and secondary school students. The Alabama Better Boating Home-study course, The Alabama Young Boatmen's Program, and water skiing safety will be stressed. An instructor's rating in boating safety will be awarded upon successful completion of this course.</td>
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</tr>
</tbody>
</table>
History and Philosophy Department

Professor J. White (chairman); Professor Emerita Roberts; Associate Professors Boucher, Hull, Shields, C. White, Williams; Associate Professor Emerita Parker; Assistant Professor Head.

The Department of History and Philosophy offers the B.A. and M.A. degrees in history and a minor in philosophy.

General Education Requirements

Transfer and UAH students who have not completed HY 101 and 102 before reaching junior standing may substitute HY 391 and 392 in GER as well as in a history major. Seniors may not take HY 101 or 102.

Area of Concentration (AOC) with History Major

A student in history must include in his academic program a minimum of 36 semester hours in history, including HY 101-102 (a part of GER), HY 221-222, and a minimum of 15 semester hours in courses numbered 300 or above, one of which must be HY 590.

A history major must take a minimum of 12 hours in American history and a minimum of 12 hours in non-American history. A history major who has taken HY 101-102 may not include HY 391-392 in his AOC except as electives.

A history major who has substituted HY 391-392 for HY 101-102 must also take at least 6 additional hours in non-American history.

The history major as defined above forms part of an area of concentration that must include one of the following variations:

1. An established minor drawn from one department now offering a major that includes a minimum of 21 semester hours, 6 of which must be numbered 300 or above.
2. A minor drawn from a discipline other than those offering a major that includes a minimum of 21 semester hours, 6 of which must be numbered 300 or above.
3. An area of cognate studies drawn from two or more disciplines that include a minimum of 21 semester hours, 9 of which must be in courses numbered 300 or above.

A student majoring in history will find a variety of AOC’s enabling him to develop depth and breadth in history and some related areas from the other humanities, the social sciences, mathematics, and the natural sciences. Counseling is available in the History and Philosophy Department for AOC’s including the following: American Studies, graduate school preparation, general, preprofessional and prelaw preparation, international studies, secondary school teaching, and the fine arts. A student who wishes to plan his own AOC can do so through his history adviser and with the coordination of the department chairman.

History Minors

A student interested in an established history minor should include appropriate history courses involving a minimum of 21 semester hours and in-
cluding 6 semester hours in courses numbered 300 or above. The minor program must have the approval of the History and Philosophy Department chairman. Appropriate history courses may also form a part of an area of cognate studies with other disciplines to support another major program. Such a program must be approved by the student’s major department and must meet the requirements established in (3) above.

**Philosophy Minors**

Students interested in a philosophy minor must take at least 21 semester hours in philosophy including at least 6 semester hours in courses numbered 300 or above. Recommended minors are available from the philosophy faculty upon request.

Appropriate philosophy courses may also be used as part of a program of cognate studies with other disciplines. Such a program must include at least 9 semester hours in courses numbered 300 or above.

**History for Second Area of Study**

Students majoring in elementary education may select history as their second area of study. Major requirements can be found in the Education section of the catalog.

To meet university requirements, a student must select a minimum of 18 hours, 15 of which must be upper level, from courses listed below with the help of the History education faculty adviser and the approval of the chairman of the Department of History and Philosophy. This curriculum may require more than the minimum total of 128 hours for the degree.

**Graduate Program**

The History graduate faculty offers courses in European and American history to satisfy the requirements for the M.A. degree in history. In addition to the Graduate School requirements, the requirements for the Master of Arts in history are:

1. Eighteen semester hours of graduate work in history, 6 of which may be transfer credit approved by the Graduate Committee. Twelve hours in American history are required; HY 605 is required.
2. Six additional hours of elective graduate courses in history or a related subject approved by the Graduate Committee.
3. At least 50 percent of the hours required for a graduate degree (exclusive of thesis credit hours) must be in courses numbered 600 or above. At least 9 hours must be in history courses numbered 600 or above (exclusive of thesis credit hours at UAH.)
4. Master’s thesis carrying a minimum of 6 hours. Upon petition to and approval by the department graduate committee, a student may substitute 9 hours of graduate history courses for the thesis.
5. If a student is full-time for three or more terms, a minimum of 30 hours is required; otherwise, 33 hours is required, and the additional hours must be in history courses. A maximum of 9 hours a term is allowed.
6. Oral comprehensive examination on courses and thesis. Student must demonstrate competency in at least two fields of history. A student who does not write a thesis, must take both oral and written examinations.

7. Student must meet all university-wide requirements not specifically designated in the above requirements.

The requirements for the Master of Arts degree for those students seeking Class A certification are the same as above with the following exceptions:
1. Nine hours of graduate courses in education may be substituted for the elective graduate courses in history or a related subject.
2. Additional graduate hours in a related subject other than education may be allowed in lieu of thesis.
3. The student must hold Class B certification.
4. A student who does not write a thesis must take both oral and written comprehensive examinations.
5. The department of Education will coordinate and direct any supplementary requirements.

Applicants for graduate study in history must present a satisfactory undergraduate scholastic record and satisfactory GRE scores in both the aptitude and advanced portion of the examination. Reading knowledge of French, German, or Spanish is required. Admission may be granted without this requirement, but the student must demonstrate reading proficiency in one of the above languages before a degree will be granted. Proficiency will be determined by the Department of History and Philosophy in cooperation with the Department of Foreign Languages and Literatures.

Each applicant must: (a) have a minimum overall undergraduate GPA of at least 3.0 (A = 4.0) or at least 3.0 for the last 60 hours of work, (b) score at least 1,000 on the aptitude portion of the GRE, and (c) have an undergraduate major in history or its equivalent as determined by the departmental Graduate Committee.

**History (HY)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>101</td>
<td>Origins and Development of the Contemporary World, Part I</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>102</td>
<td>Origins and Development of the Contemporary World, Part II</td>
<td>3 hrs.</td>
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</tbody>
</table>

**History (HY)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>T</td>
<td>Similar to HY 101. Development of the basic skills of historical study. Permission of history faculty required.</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>T</td>
<td>Similar to HY 102. Development of the basic skills of historical study. Permission of faculty required.</td>
<td>3 hrs.</td>
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</tbody>
</table>
Courses below are open to all students other than beginning freshmen, with exceptions as indicated.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>201</td>
<td>Current American Issues in Historical Perspective</td>
<td>1-3 hrs</td>
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<tr>
<td></td>
<td>The historical background and present significance of selected topics in twentieth century American experience (e.g., racial problems, the urban crisis, the impact of technology).</td>
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<tr>
<td>202</td>
<td>Current World Issues in Historical Perspective</td>
<td>1-3 hrs</td>
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<tr>
<td></td>
<td>Selected topics in world history during the twentieth century designed to foster an historical awareness of present-day problems (e.g., world communism, the meaning of anti-Semitism, the emergence of Africa).</td>
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</tr>
<tr>
<td>221</td>
<td>The United States to 1877</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>The discovery of America through the Civil War and Reconstruction.</td>
<td></td>
</tr>
<tr>
<td>222</td>
<td>The United States Since 1877</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>The United States from the end of the Civil War era to the present.</td>
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<tr>
<td>225</td>
<td>History of Alabama</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>The state's past from colonial times to the present with emphasis on its place in United States history.</td>
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<tr>
<td>229</td>
<td>Survey of Ancient Times</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>The ancient Near East, Greece, and Rome. Prerequisites: HY 101-102 or approval of instructor.</td>
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<tr>
<td>230</td>
<td>The Rise of Medieval Civilizations</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>A survey of the origins and development of the medieval world, with attention given to Byzantium and the Islamic world, as well as to the Latin west. Prerequisites: HY 101 and 102 or permission of instructor.</td>
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<tr>
<td>247</td>
<td>English Constitutional History to 1603</td>
<td>3 hrs.</td>
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<td></td>
<td>An interdisciplinary course appropriate for students of history, government, or literature. Condition of society and the impact of ideas and social forces on historical developments and the origins and evolution of English governmental and legal institutions such as common law, parliament, the judiciary, and national administration.</td>
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<tr>
<td>248</td>
<td>English Constitutional History since 1603</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>A continuation of HY 247. The impact of revolutions and industrialization upon English society, expansion of English liberties, and development of the cabinet, political parties, and the welfare state.</td>
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<tr>
<td>249</td>
<td>Current World History</td>
<td>3 hrs.</td>
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<td></td>
<td>A broadly based study of the post World War II period involving all continents.</td>
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<tr>
<td>337</td>
<td>Contemporary Latin America</td>
<td>3 hrs.</td>
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<td></td>
<td>POLITICO-socio-economic developments since World War II, including the forms of organization, the functions and operations of government, the interrelationship between demographic and other social phenomena, the writings of leading Latin American political figures, and industrial development.</td>
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<tr>
<td>341</td>
<td>Modern France</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Political, economic, social, and cultural developments from the opening of the reign of Louis XIV to the post-de Gaulle era of the Fifth Republic. Prerequisites: HY 101-102.</td>
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<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
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<tr>
<td>343</td>
<td>Modern Germany</td>
<td>3 hrs.</td>
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<tr>
<td>364</td>
<td>The Westward Movement in American History since 1803</td>
<td>3 hrs.</td>
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<tr>
<td>366</td>
<td>The Negro in Twentieth Century America</td>
<td>3 hrs.</td>
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<tr>
<td>369</td>
<td>Social and Cultural History of the United States to 1865</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>370</td>
<td>Social and Cultural History of the United States since 1865</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>373</td>
<td>Foreign Relations of the United States to 1900</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>374</td>
<td>Foreign Relations of the United States since 1900</td>
<td>3 hrs.</td>
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<tr>
<td>375</td>
<td>Imperial Russia</td>
<td>3 hrs.</td>
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<tr>
<td>376</td>
<td>Twentieth-Century Russia</td>
<td>3 hrs.</td>
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<tr>
<td>391</td>
<td>Europe, 1500-1815</td>
<td>3 hrs.</td>
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<tr>
<td>392</td>
<td>Europe Since 1815</td>
<td>3 hrs.</td>
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</tbody>
</table>

Courses listed below are open to students who have completed 15 semester hours in history or 12 semester hours in history with senior standing.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>411</td>
<td>Problems in Modern History</td>
<td>3 hrs.</td>
<td>Special themes in history such as war in the modern world, ideas in history, the African-American experience, technology, and culture.</td>
</tr>
</tbody>
</table>
414 The American South 3 hrs.
An analysis of the development of the Old South, continuity and change in the era of Civil War and reconstruction, readjustments of Southern life in the late nineteenth century, and changes in the twentieth century South.

418 Constitutional History of the United States 3 hrs.
Growth and development of the American constitutional system with emphasis on those aspects of constitutional growth which relate closely to the fundamental structure of American government and social order.

424 The Atlantic World 3 hrs.
A survey in a comparative framework of the Western European colonial empires from 1500 to 1800. Causes of expansion and social and cultural interaction of African, native American, and European peoples. The character of slavery and the plantation economies, impact of the Americas on Europe, maturation of the colonies, and beginnings of independence.

428 America’s Republican Era 3 hrs.
The development of political, social, and economic institutions in the United States and its sections from the adoption of the Constitution to the dissolution of the Republic into Civil War.

437 The Emergence of Modern America 3 hrs.
The reaction of Americans to industrialization and to the closing of the frontier from the Civil War through the Progressive era. Politics of the Gilded Age, immigration, labor unrest, and reform.

438 The United States in the Twentieth Century 3 hrs.
American society in light of social and cultural change, increased political reform, two world wars, and the Cold War.

473 The High Middle Ages, C. 1000-1500 3 hrs.
Political, economic, and cultural features of Europe when medieval civilization was at its height. Prerequisite: HY 391 or approval of instructor.

474 Renaissance and Reformation 3 hrs.
Europe during the Renaissance and Reformation. Political, social, economic, and cultural developments.

475 The Age of Absolutism 3 hrs.
Europe from the Edict of Nantes to the outbreak of the French Revolution with emphasis on the Thirty Years War, the Age of Louis XIV and the European Enlightenment.

477 The Age of Revolution 3 hrs.
European ideas and institutions from the opening stages of the French Revolution through the demise of the Napoleonic Empire, the Congress of Vienna, the Revolutions of 1830, and the Revolutions of 1848.

485 Modern Europe 3 hrs.
Major events in European history from the unification of Italy and Germany through the world wars to the present.

Courses at the 500 level are open to students who have completed 15 semester hours in history or 12 semester hours in history with senior standing. Those numbered 500-599 have the same basic content as their undergraduate (400-level) counterparts, with the exception that the graduate student will be given additional assignments and attention appropriate to graduate level study.
Constitutional History of the United States

The Atlantic World

Emergence of Modern America

The High Middle Ages, C. 1000-1500

Renaissance and Reformation

The Age of Revolution

Senior Seminar in History

Renaissance and Reformation

The Age of Revolution

Courses at the 600 level are open only to graduate students or to senior history majors with permission of the instructor.

Recent Interpretations of Modern History

Development of the ability to appraise critical historical issues through study and discussion of recent interpretations of key historical problems in modern Western history. Prerequisite: Graduate standing or permission of instructor.

Problems in Modern History

Studies in Southern History

Studies in Nineteenth Century American History

Studies in Twentieth Century American History

Studies in Early Modern European History

Europe from the Edict of Nantes to the outbreak of the French Revolution with emphasis on the Thirty Years War, the Age of Louis XIV, and the European Enlightenment.

Studies in Modern European History

Major events in European history from the unification of Italy and Germany through the world wars to the present.

Directed Readings in History

Independent reading in one field of history selected in consultation with an adviser. Open only to graduate students in history with prior permission of the department chairman.

Master's Thesis

A course required each term a student is working and receiving direction on his master's thesis. A minimum of two terms is required but no more than six hours' credit is allowed for the thesis.

Philosophy (PHL)

Introduction to Philosophy

Fundamental problems of experience.

Introduction to Logic

Methodology of correct reasoning.
103 Introduction to the Philosophy of Art
Major theories of art from Plato to the present day. Analysis of concepts of art in common among such theories.

104 Introduction to Social and Political Philosophy
Major attempts to justify exercise of political power at the expense of individual liberty from Plato to Mill.

105 Introduction to Ethics
Major theories of ethics from Aristotle to Utilitarianism and major theories about theories of ethics from naturalism to prescriptivism.

106 Introduction to the Philosophy of Religion
Major proofs of God’s existence offered in the Judeo-Christian tradition and the role that the possibility of proving God’s existence has played in religion in the Western world.

201 History of Western Philosophy
From the earliest Greek philosophers to Plato. Pre-Socratic philosophers, Socrates, and Plato, with emphasis on Plato.

202 History of Western Philosophy
From Aristotle to the Renaissance. Such philosophers as Aristotle, the Stoics, the Epicureans, Saint Augustine and Thomas Aquinas, with emphasis on Aristotle. Prerequisite: PHL 101 or one course in the history of philosophy or approval of instructor.

203 History of Western Philosophy
Seventeenth-century philosophers such as Descartes and Spinoza. Prerequisite: PHL 101 or one course in history of philosophy or approval of instructor.

204 Comparative Religions: Judaism, Christianity, Islam
An analytical and comparative study of three of the world’s higher religions: Judaism, Christianity, Islam. The origins, developments, traditions, and beliefs of these religions are compared and contrasted. Prerequisites: HY 101 and 102.

The following courses are open to students who have at least junior standing or have completed at least 6 hours of philosophy or have approval of instructor.

304 History of Western Philosophy
Eighteenth-century philosophers such as Leibniz, Locke, Berkeley, and Hume. Prerequisites: PHL 101 and one course in the history of philosophy or approval of instructor.

305 History of Western Philosophy
Kant and nineteenth-century philosophers such as Kant, Hegel, and Nietzsche. Prerequisites: PHL 101 and one course in the history of philosophy or approval of instructor.

306 Contemporary European Philosophy
Twentieth-Century European philosophers such as Bergson, Husserl, Heidegger, and Sartre, with emphasis on phenomenology and existentialism. Prerequisites: PHL 101 and one course in the history of philosophy or approval of instructor.

312 Contemporary Anglo-Saxon Philosophy
Twentieth-century philosophers such as James, Bertrand, Russell, Carnap, and Wittgenstein, with emphasis on pragmatism, logical atomism, logical positivism, and philosophical analysis. Prerequisites: PHL 101 and one course in the history of philosophy or approval of instructor.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>316</td>
<td>Classical Political Philosophy</td>
<td>3 hrs.</td>
<td>Historical survey and philosophical analysis of fundamental ideas of representative thinkers in Western political theory to Machiavelli. (Same as PSC 316).</td>
</tr>
<tr>
<td>317</td>
<td>Modern Political Philosophy</td>
<td>3 hrs.</td>
<td>Historical survey and philosophical analysis of fundamental ideas of representative thinkers in Western political theory from Machiavelli. (Same as PSC 317).</td>
</tr>
<tr>
<td>320</td>
<td>Symbolic Logic</td>
<td>3 hrs.</td>
<td>Symbolic deductive logic, including propositional calculus (truth-functional logic), predicate calculus (propositional functions and quantification), and the logic of relations. Prerequisite: PHL 102.</td>
</tr>
<tr>
<td>322</td>
<td>Inductive Logic</td>
<td>3 hrs.</td>
<td>Nonsymbolic inductive logic, including some problems of the philosophy of science. Prerequisite: PHL 102.</td>
</tr>
<tr>
<td>332</td>
<td>Epistemology</td>
<td>3 hrs.</td>
<td>Critical investigation of fundamental problems of knowledge such as knowledge and belief, truth, certainty and skepticism, perception, logic, explanation, and justification. Prerequisites: 9 hours of philosophy including PHL 101 or approval of instructor.</td>
</tr>
<tr>
<td>342</td>
<td>Metaphysics</td>
<td>3 hrs.</td>
<td>Critical investigation of the fundamental problems of reality such as appearance and reality, substance and universals, matter and life, mind and body, space and time, casualty, necessity and freedom. Prerequisites: 9 hours of philosophy including PHL 101 or approval of instructor.</td>
</tr>
<tr>
<td>352</td>
<td>Ethics</td>
<td>3 hrs.</td>
<td>Investigation of fundamental problems of conduct such as good and evil, right and wrong, rights and obligations, values and ways of life. Prerequisites: 6 hours of philosophy including PHL 101 or approval of instructor.</td>
</tr>
<tr>
<td>385</td>
<td>Selected Topics in the History of Philosophy</td>
<td>3 hrs.</td>
<td>Intensive examination of particular problems, periods, or movements in the history of philosophy. Prerequisite: Determination in accordance with course content.</td>
</tr>
</tbody>
</table>
Music Department

Professors Boyer (chairman), Pales; Assistant Professors Contreras, Graves; Adjunct Assistant Professor Groom; Adjunct Instructor Dodson.

Courses for the General Student (Non-Music Majors)

Besides providing degree programs in music and music education, the Department of Music faculty has developed a variety of opportunities for instruction in music-making and study for students majoring in other disciplines. All students are encouraged to include at least one music experience in their elective or humanities requirements. The following courses and ensembles are open to all university students with little or no musical experience required. Upper-level credit is available for some courses. Students may receive studio instruction (private lessons) in voice and in nearly every musical instrument.

MU 100  Fundamentals of Music
MU 109  Creative Dance
MU 110  Introduction to Music Listening
MU 111  American Folk Music and Jazz
MU 112  Trends in Popular and Commercial Music
MU 208  Contemporary Dance Techniques
MU 209  Environmental Dance
MU 210  Music with the Maestro
MU 215  Music for the Young Child
MU 310  American Music
MU 190/390  UAH Choir
MU 191/391  Premier Singers
MU 192/392  Huntsville Village Singers
MU 198/398  Huntsville Symphony Orchestra
MU 199/399  UAH Wind Ensemble
MU 290  Opera/Music Theatre Workshop
MU 296  Pep Band
MU 297  Jazz Workshop

Music Major

The major in music, with emphasis in either performance or music literature, is a degree program of 134 credit hours providing ample training and experience in performance and sufficient foundation in theory and literature. It is built upon the belief that a liberal arts base prepares the musician and musician-teacher well. The degree provides the foundation most students need for graduate study and many professional musical opportunities. To minimize degree hours, a music major should choose a minor from the disciplines represented in GER. There is opportunity for a variety of discipline mixture with the music major thus accommodating students with dual interests and abilities.
### Music Education Major

The major in music education is a 140-credit hour degree program built upon a broad liberal arts base, integrating music and professional education courses to develop a superior music teacher, certified to teach at all levels N-12 (Class B Professional Teacher's Certificate) with strength in either vocal or instrumental music. Students must demonstrate throughout their course of study competencies in both performance and teaching. Because of the demands of this program, there is little opportunity to elect courses other than those required and outlined below. With additional study of the principal instrument and a senior recital performance, music education students are eligible to receive a special performance certificate. Faculty approval is required.

### Bachelor of Arts in Music and Music Education

Students wishing to pursue a music major should have pre-college training in their principal or major performing instrument or voice and have ability to read music fluently. Basic keyboard ability is helpful but not mandatory.

Entering freshmen and transferring students are required to take a placement examination in rudiments (scales, keys, intervals, triads, general notation) and music reading, performance (principal or major instrument or voice) and piano. Deficiencies can be removed through remedial instruction.

#### I. General Education Requirements 44-54 hrs.

GER for the B.A. degree are listed in the academic information section. For performance and literature emphasis programs, at least one course in philosophy should be selected for the social science requirement and Spanish, French, or German for the language requirement. For music education emphasis students must select at least one course in economics for the social science requirement and option C or D to satisfy their science-mathematics requirements.

#### II. Area of Concentration (select A or B)  Maximum: 70 hrs.

**A. Music Performance or Literature Emphasis**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Description</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MU 1-1/4-3</td>
<td>Principal Instrument* (12 terms; 8 hours upper level)</td>
<td>16</td>
</tr>
<tr>
<td>MU 1-0/2-0</td>
<td>Secondary Instrument (6 terms)</td>
<td>4</td>
</tr>
<tr>
<td>MU 101, 102, 201, 202, 203</td>
<td>Theory-Harmony</td>
<td>10</td>
</tr>
<tr>
<td>MU 104, 105, 204, 205, 206</td>
<td>Musicianship Skills</td>
<td>5</td>
</tr>
<tr>
<td>MU 110</td>
<td>Introduction to Music Listening</td>
<td>3</td>
</tr>
<tr>
<td>MU 311, 312</td>
<td>Music History</td>
<td>6</td>
</tr>
<tr>
<td>MU 401</td>
<td>Twentieth-Century Materials and Techniques</td>
<td>3</td>
</tr>
</tbody>
</table>

*Students electing the music literature emphasis will be limited to 12 hours rather than 20 hours of studio instruction. Eight hours of appropriate upper-level music literature and history courses replace studio work. Other special projects replace junior and senior recitals.*
MU 325 Conducting ................................................ 2
Upper-level music elective ........................................... 2
Ensembles** ..................................................... 3-6
Junior recital .................................................................. 0
Senior recital ................................................................. 0

Minor
Selected minor from a discipline represented in the GER.

B. Music Education Emphasis (Composite Major-Minor)

Music Performance, Theory, and Literature

MU 1-0/4-0 Principal Instrument (12 terms; 4 hours upper level) .................. 8
Junior recital (solo and ensemble works) .................................................. 0
Secondary instrument(s): (6 terms) ............................................................. 4
  Voice principals elect piano, MU 130-230
  Piano principals elect voice, MU 140-240
Instrument principals elect the following courses:
  Percussion, MU 184
  Strings, MU 154, 254
  Woodwinds, MU 164, 264
  Brasses, MU 174, 274 (one course to be deleted in principal instrument area)
Ensembles** ..................................................... 3-6

MU 101, 102, 201, 202, 203 Theory-Harmony ........................................ 10
MU 104, 105, 204, 205, 206 Musicianship Skills ..................................... 5
MU 110 Introduction to Music Listening .................................................. 3
MU 311, 312 Music History ................................................................. 6
MU 401 Twentieth-Century Materials and Techniques ................................ 3
MU 416 Orchestration ........................................................................... 2
MU 325 Conducting ............................................................................. 2

Music Education
MUE 225 Introduction to Music Education ........................................... 1
MUE 326 Teaching General Music in Elementary Schools ....................... 3
MUE 327 Teaching General Music in Secondary Schools ......................... 3
MUE 428 Organizing and Directing Vocal Groups in Secondary Schools ........ 2
  or
MUE 429 Organizing and Directing Instrumental Groups in Secondary Schools .... 2

Professional Education
ED 230 Human Development ............................................................... 3
ED 261 Foundations of Education in U.S. ............................................... 3
ED 263 Educational Psychology .............................................................. 3

**An appropriate ensemble must be selected each term student is enrolled full-time. Students must complete a minimum of twelve terms of small and large ensemble experiences; however, a maximum of 6 hours may count toward degree.
ED 408 Teaching Reading in the Secondary School ...................... 3
ED 410 Foundations of Educational Evaluation ........................... 3
ED 490 Principals of High School Teaching ............................... 3
ED 499 N-12 Internship*** ........................................... 9
ED 593 Education of Exceptional Children and Youth .................. 3

*Students electing the music literature emphasis will be limited to 12 hours rather than 20 hours of studio instruction. Eight hours of appropriate upper-level music literature and history courses replace studio work. Other special projects replace junior and senior recitals.

**An appropriate ensemble must be selected each term student is enrolled full-time. Students must complete a minimum of twelve terms of small and large ensemble experiences; however, a maximum of 6 hours may count toward degree.

***Students must pass a piano competency examination before internship. ED 490 must be taken concurrently with internship.

III. Electives (outside of AOC areas) 6-20 hrs.
Minimum: performance and music literature, 12 hours; music education 6 hours.

Music for Second Area of Study
Students majoring in elementary education may select music as their second area of study. See major requirements in Education section.
To meet university requirements select a minimum of 18 hours, 15 of which must be upper level from the following:

MU 101, 102, 201 Theory of Music ..................................... 6
MU 104, 105, 204, Musicianship Skills ................................ 3
MU 110 Introduction to Music Listening ............................... 3
MU 310 Survey of American Music ..................................... 3
MU 312 Music History II ................................................... 3
MUE 326 Teaching General Music in Elementary School ............ 3
(Replacement for MU 215 in the GER)
MU 390 or 391 Ensemble .............................................. 27

The curriculum, including music, may require more than 128 hours for the degree.

Minor in Music
Students may select music as a supportive minor to their major discipline. A selection of combinations with majors in other disciplines are on file in the Music Department, or students may formulate their own with approval of representative faculty advisers from departments involved. Generally 25 hours of music are necessary (3 hours upper-level), including the following courses:
MU 1-0/2-0 Studio Instruction ......................................... 4
MU 101, 102, 201 Theory-Harmony ................................... 6
MU 104, 105, 204 Musicianship Skills .................................. 3
MU 110 Introduction to Music Listening ............................... 3
MU 312 History of Music II .......................................... 3
Ensemble ....................................................................... 6

25 hrs.

Music (MU)

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Fundamentals of Music</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Basic music presented in a practical way for students who have little or no musical training.</td>
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<tr>
<td></td>
<td>Mechanical aspects of music—clefs, notation, scales, intervals, and rhythm with some aural</td>
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<tr>
<td></td>
<td>skills and practice in writing and harmonizing melodies. For students who expect to major</td>
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<tr>
<td></td>
<td>or minor in music, this is a remedial course and may not be taken for degree credit.</td>
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<tr>
<td>101</td>
<td>Theory of Music I</td>
<td>2 hrs.</td>
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<tr>
<td></td>
<td>Fundamentals of basic musicianship through practical as well as theoretical studies.</td>
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<tr>
<td></td>
<td>Development of skills in written harmony and formal analysis. Appropriate Musicianship</td>
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<tr>
<td></td>
<td>skills (e.g. MU 104) to be taken concurrently throughout theory program. Prerequisite:</td>
<td></td>
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<tr>
<td></td>
<td>approval of instructor.</td>
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<tr>
<td>102</td>
<td>Theory of Music II</td>
<td>2 hrs.</td>
</tr>
<tr>
<td></td>
<td>Continuation of MU 101. Prerequisites: MU 101 and 104.</td>
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</tr>
<tr>
<td>104</td>
<td>Musicianship Skills I</td>
<td>1 hr.</td>
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<tr>
<td></td>
<td>To be taken concurrently with MU 101 and designed to complement written theoretical studies.</td>
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<tr>
<td></td>
<td>Exercises in sight singing using solfege, numbers, or neutral syllables. Basic conducting</td>
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<tr>
<td></td>
<td>(beat patterns), rhythmic execution and melodic, harmonic, and rhythmic dictation.</td>
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<td></td>
<td>Prerequisite: approval of instructor.</td>
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<tr>
<td>105</td>
<td>Musicianship Skills II</td>
<td>1 hr.</td>
</tr>
<tr>
<td></td>
<td>Continuation of MU 104. Prerequisites: MU 101 and 104.</td>
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<tr>
<td>109</td>
<td>Creative Dance (Basic Modern Technique)</td>
<td>1 hr.</td>
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<tr>
<td></td>
<td>Time and space through movement. Proper body placement, control, and agility while</td>
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<tr>
<td></td>
<td>thinking creatively. No dance experience necessary.</td>
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</tr>
<tr>
<td>110</td>
<td>Introduction to Music Listening</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Basic appreciation course. Ideas and issues in types of world music through listening,</td>
<td></td>
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<tr>
<td></td>
<td>reading, and discussion.</td>
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</tr>
<tr>
<td>111</td>
<td>American Folk Music and Jazz</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>History and development of American folk music and jazz. Current developments.</td>
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</tr>
<tr>
<td>112</td>
<td>Trends in Popular and Commercial Music</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Popular music stemming from folksongs, blues, and dance hall music. Rock music from the</td>
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<td></td>
<td>beginning; Bill Haley, Elvis Presley, the Beatles, and the growth of the recording industry.</td>
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<tr>
<td>201</td>
<td>Theory of Music III</td>
<td>2 hrs.</td>
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<tr>
<td></td>
<td>Continuation of studies on a more advanced basis than MU 101-102. Prerequisites: MU 102</td>
<td></td>
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<tr>
<td></td>
<td>and 105.</td>
<td></td>
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<tr>
<td>202</td>
<td>Theory of Music IV</td>
<td>2 hrs.</td>
</tr>
<tr>
<td></td>
<td>Continuation of MU 201. Prerequisites: MU 201 and 204.</td>
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</tr>
</tbody>
</table>
203 Theory of Music V
Continuation of MU 202. Prerequisites: MU 202 and 205.

204 Musicianship Skills III
Continuation of MU 105. Prerequisites: MU 102 and 105.

205 Musicianship Skills IV
Continuation of MU 204. Prerequisites: MU 201 and 204.

206 Musicianship Skill V
Continuation of MU 205. Prerequisites: MU 202 and 205.

208 Contemporary Dance Techniques
Achievement of flexibility, physical grace, and coordination required of a dance. Prerequisite: audition or approval of instructor.

209 Environmental Dance (summer only)
Physical and psychological interaction with different environmental settings. Evaluation of this experience and interpretation in classroom and on stage. Prerequisite: two terms of creative dance or approval of instructor.

210 Music with the Maestro
Survey of music masterpieces, (e.g. Beethoven 5th Symphony, Stravinsky "Firebird Suite," works of J.S. Bach). Focus on live experiences with music and musicians. Classes with live performances, records, films, and informal discussion with musicians. Taught by conductor of the Huntsville Symphony Orchestra.

215 Music for the Young Child
A course for elementary and special education teachers, recreational therapists, church school, or prospective teachers not trained in music. Preparation to teach children ages 3-12 through experience in singing, reading, planning, and presentation. Elementary education majors using music as their second area of study must select MUE 326 rather than MU 215 for their GER.

304 Analysis of Music Form
Representative small and large compositions of the sixteenth through the twentieth centuries for structure and form. Prerequisite: MU 201, 110, or approval of instructor. Offered upon demand.

310 American Music
A course designed for the non-music major, important aspects of American musical art are presented, including the Colonial period, folksong and European influences, jazz, Broadway and film scores. The contemporary period beginning with Charles Ives is also covered.

311 History of Music I
Development of music as an art in Western civilization to 1750. Representative musical works and style. Understanding of musical concepts in view of their historical background. Prerequisite: MU 201, 204, 110, or approval of instructor.

312 History of Music II
Music as an art in western civilization from 1750 to the present. Formal and stylistic problems through representative works and an understanding of musical concepts in light of their historical and general cultural context. Prerequisites: MU 201, 204, 110, or approval of instructor.

313 Survey of a Musical Form
A musical form (e.g. concerto, opera, etc.) from its origins to present time. Variable topics. Prerequisites: MU 203, and 311 or 312.
314 Biographical Survey
Life and work of great composers of music. Variable topics. Prerequisites: MU 203, and 311 or 312.

320 Piano Pedagogy
Materials, techniques, and practices in teaching beginners and students through lower advanced grades of piano. Practical experience. Prerequisite: approval of instructor. Offered upon demand.

321 Piano Technology
Development of keyboard instruments, use of equal-temperament tuning, and minor piano action regulation, and repair. Offered upon demand. Prerequisite: ability to read music and familiarity with keyboard.

325 Conducting
Basic techniques of choral and instrumental conducting. Prerequisites: MU 201, 204, or approval of instructor.

401 Twentieth Century Materials and Techniques
Systems of tonal organizations, compositional procedures, terminology, and analytical methods that relate to music of our century. Prerequisites: MU 203, 206, 312, or approval of instructor.

410 Piano Literature
Music for string keyboard instruments from the pre-piano forte period to the present. Representative works from all periods. Prerequisites: MU 203, 206, 312 or permission of instructor. Offered upon demand.

411 Musicum Practicum
Courses of study and activity developed by the student(s) and submitted to music faculty for approval. Projects to reinforce learning and performance experiences. May be repeated, but no more than 2 hours count toward degree requirements.

416 Orchestration
Instruments of the band and orchestra, their ranges, transpositions, and capabilities. Practical experience in arranging for instruments. Prerequisites: MU 203, 206.

425 Advanced Conducting
Review of basic conducting patterns. Emphasis on communication as the role of the conductor. Detailed score preparation and marking. Prerequisite: MU 325.

510 Concert Band Literature and Conducting Critique
Literature for concert band and wind ensemble. Variety of music (type, style, and difficulty) as well as in-depth study of a few scores by each student for critiques of rehearsal and conducting techniques. UAH Summer Band serving as reading and laboratory ensemble. Prerequisite: MU 425; senior or permission of instructor.

511 Master Class in Piano Literature and Pedagogy
Topic of course varies: Examination of selected forms.

520 Arts in the Elementary School Curriculum
An interdisciplinary approach to teaching the arts in elementary school, including music, movement, and theater and the visual arts. Practical experiences in playing instruments (percussion), moving, drawing, creating, singing, working in clay, play-acting and pantomime. Methodology for integrating the arts through active participation.

521 Philosophical Principles of Music Education
Philosophical base of music education, its justification in public schools, and criteria for determining its objectives. Application of aesthetic theory to analysis and evaluation of music.
Applied Studio and Class Instruction

Students must fill out a "Request for Studio Instruction" card obtained in the Music Department before each term they are enrolled. Beginning and transfer students who plan to take private instruction for music credit must demonstrate their level of proficiency to the instructor before registration. Instruction varies from forty to sixty minutes weekly.

To advance to the next 100 level of studio instruction (i.e., from 133 to 231 or 130 to 230), each student must perform before a faculty jury. The jury may retain students at any level until proper achievement is reached for advancement or completion of degree performance competencies. Students not intending to major or minor in music should enroll in MU 130, 140, 150, 160, or 170 and do not require a jury. They may repeat private instruction as long as the instructor agrees that satisfactory progress is made. A special studio instruction fee is charged (see Fees).

Students taking studio instruction must attend performances, the monthly student recital program and special performance classes. A student can be excused only with written permission of department chairman.

As part of studio instruction, students enrolled as full-time music majors must attend at least six approved concerts a term; other students enrolled in studio instruction must attend three.

130 Studio Instruction in Keyboard (piano and organ)1
Prerequisite: approval of instructor. Studio instruction fee: Level 6.

230 Studio Instruction in Keyboard2
Prerequisite: MU 130 and approval of instructor. Studio instruction fee: Level 6.

330 Studio Instruction in Keyboard2
Prerequisite: MU 230 and approval of instructor. Studio instruction fee: Level 6.

430 Studio Instruction in Keyboard2
Prerequisite: MU 330 and approval of instructor. Studio instruction fee: Level 6.

131, 132, 133, 231, 233, 331, 332, 333, 431, 432, 433
Studio Instruction in Keyboard
For principal instrument music credit. Studio instruction fee: Level 8. Prerequisite: approval of instructor.

140 Studio Instruction in Voice1
Prerequisite: approval of instructor. Studio instruction fee: Level 6.

240 Studio Instruction in Voice2
Prerequisite: MU 140 and approval of instructor. Studio instruction fee: Level 6.

340 Studio Instruction in Voice2
Prerequisite: MU 240 and approval of instructor. Studio instruction fee: Level 6.

440 Studio Instruction in Voice2
Prerequisite: MU 340 or approval of instructor. Studio instruction fee: Level 6.

141, 142, 143, 241, 242, 243, 341, 342, 343, 441, 442, 443
Studio Instruction in Voice
For principal instrument music credit. Studio instruction fee: Level 8. Prerequisite: approval of instructor.
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>Studio Instruction in Strings (orchestral strings and guitar)</td>
<td>2/3</td>
<td>Approval of instructor. Studio instruction fee: Level 6.</td>
</tr>
<tr>
<td>250</td>
<td>Studio Instruction in Strings</td>
<td>2/3</td>
<td>MU 150 and approval of instructor. Studio instruction fee: Level 6.</td>
</tr>
<tr>
<td>350</td>
<td>Studio Instruction in Strings</td>
<td>2/3</td>
<td>MU 250 and approval of instructor. Studio instruction fee: Level 6.</td>
</tr>
<tr>
<td>450</td>
<td>Studio Instruction in Strings</td>
<td>2/3</td>
<td>MU 350 and approval of instructor. Studio instruction fee: Level 6.</td>
</tr>
<tr>
<td>151, 152, 153, 251, 252, 253, 351, 352, 353, 451, 452, 453</td>
<td>Studio Instruction in Strings</td>
<td>1</td>
<td>For principal instrument music credit. Studio instruction fee: Level 8. Prerequisite: approval of instructor.</td>
</tr>
<tr>
<td>154, 254</td>
<td>Class Instruction in Strings</td>
<td>2/3</td>
<td>For secondary instrument, music education emphasis students. Studio instruction fee: Level 6.</td>
</tr>
<tr>
<td>160</td>
<td>Studio Instruction in Woodwinds</td>
<td>2/3</td>
<td>Approval of instructor. Studio instruction fee: Level 6.</td>
</tr>
<tr>
<td>260</td>
<td>Studio Instruction in Woodwinds</td>
<td>2/3</td>
<td>MU 160 and approval of instructor. Studio instruction fee: Level 6.</td>
</tr>
<tr>
<td>460</td>
<td>Studio Instruction in Woodwinds</td>
<td>2/3</td>
<td>MU 360 and approval of instructor. Studio instruction fee: Level 6.</td>
</tr>
<tr>
<td>161, 162, 163, 261, 262, 263, 361, 362, 363, 461, 462, 463</td>
<td>Studio Instruction in Woodwinds</td>
<td>1</td>
<td>For principal instrument music credit. Studio instruction fee: Level 8. Prerequisite: approval of instructor.</td>
</tr>
<tr>
<td>164, 264</td>
<td>Class Instruction in Woodwinds</td>
<td>2/3</td>
<td>For secondary instrument, music education emphasis students. Studio instruction fee: Level 6.</td>
</tr>
<tr>
<td>170</td>
<td>Studio Instruction in Brass</td>
<td>2/3</td>
<td>Approval of instructor. Studio instruction fee: Level 6.</td>
</tr>
<tr>
<td>270</td>
<td>Studio Instruction in Brass</td>
<td>2/3</td>
<td>MU 170 and approval of instructor. Studio instruction fee: Level 6.</td>
</tr>
<tr>
<td>370</td>
<td>Studio Instruction in Brass</td>
<td>2/3</td>
<td>MU 270 and approval of instructor. Studio instruction fee: Level 6.</td>
</tr>
<tr>
<td>470</td>
<td>Studio Instruction in Brass</td>
<td>2/3</td>
<td>MU 370 and approval of instructor. Studio instruction fee: Level 6.</td>
</tr>
</tbody>
</table>

1 For music education emphasis, secondary instrument, or non-music credit. Course may be repeated.

2 For music education emphasis or secondary instrument credit. Course may be repeated.
174, 274  Class Instruction in Brass  
For secondary instrument, music education emphasis students. Studio instruction fee: Level 6.

180  Studio Instruction in Percussion¹  
Prerequisite: approval of instructor. Studio instruction fee: Level 6.

280  Studio Instruction in Percussion²  
Prerequisite: MU 180 and approval of instructor. Studio instruction fee: Level 6.

380  Studio Instruction in Percussion²  
Prerequisite: MU 280 and approval of instructor. Studio instruction fee: Level 6.

480  Studio Instruction in Percussion²  
Prerequisite: MU 380 and approval of instructor. Studio instruction fee: Level 6.

181, 182, 183, 281, 282, 283, 381, 382, 383, 481, 482, 483  
Studio Instruction in Percussion  
For principal instrument music credit. Studio instruction fee: Level 8. Prerequisite: approval of instructor.

184  Class Instruction in Percussion  
For secondary instrument, music education emphasis student. Studio instruction fee: Level 6.

¹For music education emphasis, secondary instrument, or non-music credit. Course may be repeated.

²For music education emphasis or secondary instrument credit. Course may be repeated.

Ensembles
The UAH music ensembles are open to all students; some ensembles require an audition. Ensemble participation is essential for all music majors and minors, and an appropriate ensemble must be selected each term a student is enrolled for degree requirements. A maximum of 6 semester hours in ensemble courses (MU 190-199, 290-299, 390-399) may be applied as credit toward total degree requirements in any discipline program. Students may continue to enroll, however, and repeatedly participate in ensembles throughout their university life. Only students who have held membership in an ensemble for six terms should enroll in 300-level instruction. Through audition students may receive upper-level credit after three terms of membership.

190, 390  UAH Choir  
Mixed voices singing the serious choral repertoire. Open to all students by audition.

191, 391  Premier Singers  
Mixed voices singing pop and folk music.

192, 392  Huntsville Village Singers  
A select small ensemble of mixed voices. Open to all students by audition.
193 Summer Chorus
Mixed voices singing a variety of choral music.

195 Music for Awhile Ensemble
Solo-ensemble performance specializing in early and contemporary music.

196 Chamber Ensembles
Discussion, evaluation, and performance of literature available for selected small musical ensembles. Piano trios, quartets, quintets, string quartets, woodwind, brass, percussion, and vocal ensembles.

197 Summer Band
Rehearsal and performance of a variety of music for concert band. By audition with conductor.

198, 398 Huntsville Symphony Orchestra
An orchestra of seventy-five players with international guest artists. Performance of major symphonic, operatic, and choral literature. By audition with conductor.

199, 399 UAH Wind Ensemble
Open to all students by audition with conductor. Preparation and performance of the finest music literature for wind ensemble and concert band. Required attendance at all rehearsals and performances.

290 Opera/Music Theatre Workshop
Instruction in stage movement and mannerisms, character and vocal coaching leading to performances of scene excerpts. Prerequisites: Elementary music reading and intermediate singing ability.

296 Piano Accompanying
A course for the pianist who needs instruction and assistance in the areas of ensemble playing, accompanying soloists, choral ensembles, etc. Instruction is given in musical analysis, rehearsal techniques and improvisation. The student will be expected to show skills in practical situations. Prerequisite: 200 level piano; permission of instructor.

297 Jazz Workshop
Two broad opportunities for students who participate; performance of jazz, both written and improvised, and instruction in jazz arranging, composition, and improvisation available. Performing ability required. By audition with instructor.

298 Pep Band
Open to all students with previous band experience. This group utilizes traditional band instrumentation and provides appropriate music for selected UAH athletic events. No audition is necessary. Winter term only. Required attendance at rehearsals and performances.

299 University Brass
A musical organization for rehearsal and performance of selected ensemble literature for brass instruments. Open to all students by audition with conductor. Required attendance at all rehearsals and performances.

Music Education (MUE)

225 Introduction to Music Education
Philosophical orientation into music teaching. Observation and mini-teaching experiences with follow-up discussions. Prerequisites: MU 201, 110, or approval of instructor.
326 Teaching General Music in Elementary Schools 3 hrs.
Materials and methods. Emphasis on developing teaching competencies. Prerequisites: MU 201, 204, 110 or permission of instructor.

327 Teaching General Music in Secondary Schools 3 hrs.
Materials and methods. Emphasis on developing teaching competencies. Prerequisites: MU 201, 204, 110 or permission of instructor.

428 Organizing and Directing Vocal Groups in Secondary Schools 2 hrs.
Repertoire, procedures for administering and teaching school glee clubs, choirs, and vocal ensembles. Prerequisites: MUE 326, 327 and MU 425 or permission of instructor.

429 Organizing and Directing Instrumental Groups in Secondary Schools 2 hrs.
Repertoire, procedures for administering and teaching school bands, orchestras and instrumental ensembles. Prerequisites: MUE 326, 327 and MU 425 or permission of instructor.
Political Science and Criminal Justice Department

Professor Meek; Associate Professors MacDougall; Williams, (chairman); Assistant Professors Brown, Randall; Adjunct Assistant Professors Accardi, Dowdy, Rice, Vizzini, White; Instructor Armor; Adjunct Instructors Bill, Williams, Wolf.

The Department of Political Science and Criminal Justice offers undergraduate majors and minors in political science and criminal justice. In addition, the department offers graduate courses as part of the public administration option in the Master of Administrative Science Program.

Area of Concentration (AOC) With Political Science Major

A student who wishes to major in political science must include in his academic program a minimum of 36 semester hours in political science, including PSC 101, 235, 246, 311 and either 316 or 317 (15 hours). In addition, majors are required to take a minimum of three (3) hours from each of four fields of political science: International Relations and Comparative Government (PSC 336, 337, 338, 343, and 465); Law and Theory (PSC 271, 318, 371, 471); Sub-Regional Politics and Administration (PSC 221, 223, 323, 350, 423, and 450); and Political Process and Institutions (PSC 307, 308, 365, 369). The remaining nine (9) hours may be taken as electives from the above courses or other political science courses. A minimum of 15 semester hours must be in political science courses numbered 300 or above.

GER should include MA 105 (College Algebra) unless placement test indicates Level II or above. Additional courses required that may be counted as electives on the AOC are AHS 300, ARH 109, and MU 110.

A student with a major in political science must choose a minor from another discipline; instead of a minor, the student has the option of choosing 21 hours of cognate studies, a group of courses drawn from two or more disciplines of which 9 hours must be in upper-level course work.

Freshmen considering a major in political science should consult with a faculty advisor in the department during their freshman year. Sophomores must file an AOC declaration before the end of their sophomore year. Transfer students are advised to consult with a faculty member in the department before scheduling courses.

Guidelines for curriculum planning in political science are available in the department office. These guidelines are designed to consider such intellectual and vocational interests as prelaw training, international studies, public service, and graduate-school preparation.

Minor in Political Science

The student with a minor in political science must take 21 hours of course work including PSC 101, 235 and 246, and at least 6 hours of course work 300 or above.
Political Science for Second Area of Study

Students majoring in elementary education may select political science as their second area of study. Major requirements can be found in the Education section. Students seeking certification in secondary education should seek advisement from the Education Department where an AOC leading to endorsements in political science and/or the social sciences can be developed.

Area of Concentration (AOC) with Criminal Justice Major

A student who wishes to major in criminal justice must include a minimum of 36 semester hours in criminal justice, including CJ 101, 271, AHS 300, CJ 320, 311, and minimum of 15 semester hours of courses numbered 300 or above. GER should include MA 105 (College Algebra) unless placement tests indicate Level II or above. Additional required courses that may be counted as electives on the AOC are either ARH 109 or MU 110.

Freshmen considering a major in criminal justice should consult with a faculty adviser in the program during their freshman year. Transfer students should consult with a faculty member in the program before scheduling courses at UAH. Sophomores must file an AOC declaration before the end of their sophomore year. The AOC provides the student an opportunity to develop an academic program that meets his interests and objectives. Guidelines for curriculum planning in criminal justice are available in the Department of Political Science and Criminal Justice. These guidelines consider such intellectual and vocational interests as forensic sciences, law enforcement, court services, prisons, rehabilitation programs, social work, juvenile justice, community-based programs, probation, parole, and criminal justice planning.

A student developing an area of concentration with a criminal justice major must choose a minor consisting of 21 semester hours from a discipline other than criminal justice. Recommended disciplines are psychology, sociology, political science, or management. Instead of a minor, the student may choose 21 hours in cognate studies, a group of courses from two or more disciplines of which 9 hours must be in upper-level course work.

The criminal justice major incorporates three options, one of which must be chosen by the student in addition to the 15-hour core curriculum.

Criminology Option

Choose 21 hours: CJ 201, 301, 303, 304, 315 and six hours from CJ 495 and/or criminal justice electives.

Corrections Option

Choose 21 hours: CJ 301, 302, 303, 305, 420, and six hours from CJ 495 and/or criminal justice electives.

Criminal Justice Administration Option

Choose 21 hours: CJ 303, 304, 305, 315, 420, and six hours from CJ 495 and/or criminal justice electives. (A management minor is strongly recommended for students choosing this option.)

Deviations from and substitutions in the above options must be approved by the Criminal Justice Program Coordinator or the Department Chairman.
Minor in Criminal Justice

Students seeking to minor in criminal justice must have 21 hours of criminal justice course work, including CJ 101 and six hours of courses numbered 300 and above.

Internship Programs

The Department of Political Science and Criminal Justice has an internship program for majors in political science, criminal justice, public administration, and prelaw. Internships bridge the gap between learning experience and entry into professional life. Interested juniors and seniors should apply to the Department of Political Science and Criminal Justice.

Graduate Courses in Political Science

The department offers political science courses as a part of the Public Administration Option in the Master of Administrative Science program. MAS students in the Public Administration Option are required to take fifteen hours of 600 level courses including PSC 650, 652, and 655.

Associate Certificate Program in Law Enforcement

This curriculum is primarily intended for in-service law enforcement officers and persons preparing for major work in this field. The Associate in Law-Enforcement Certificate will be awarded upon completion of the general requirements with 30 semester hours in specialty and supporting courses as follows:

**Law Enforcement Curriculum ............................................. 30 hrs.**

Specialty Courses: CJ 101 required; minimum of 12 hours from CJ 201, CJ 271, CJ 203, CJ 301, CJ 303, CJ 304, CJ 305, and CJ 400 or CJ 401.

Supporting Courses: PSC 101, SOC 100, and PY 103 required; remaining hours from PSC 102, PSC 221, SOC 320, and SOC 420.

**Electives ................................................................. 4-6 hrs.**

Other courses may be substituted with permission from the Criminal Justice Program coordinator or the chairman of the department.

Requirements for the associate certificate are as follows: (1) Complete 60 semester hours credit, including 24 to 26 hours in GER, 30 hours in the law enforcement curriculum, and the remaining hours in free electives; (2) earn an overall average of C in all courses attempted and all specialty courses attempted.

Transfer students must earn at least 18 semester hours at UAH including 6 hours in the law enforcement curriculum and must complete 6 of the last 9 hours credit at UAH. In addition to the overall grade average, transfer students must earn an average grade of C in all courses attempted at UAH and all courses in the law enforcement curriculum at UAH.

Up to 30 semester hours of the total requirements for the associate certificate may be earned by other than classroom work (e.g., CLEP, credit by examination, correspondence study, educational experience in the armed forces, and professional certificate programs).

The GER for the associate certificate include 24 to 26 semester hours credit as follows:
1. English Composition, 6 hours in (a) EH 101 and EH 102 or (b) CLEP English composition examination.
2. History-Social Sciences, 6 hours in (a) HY 101 and HY 102 or (b) history, sociology, psychology, political science, or economics courses or examination, or (c) CLEP social sciences-history examination.
3. Science-Mathematics, 6 to 8 hours in (a) mathematics, biology, physics, chemistry, or natural science courses or examinations or (b) CLEP natural sciences examination or (c) CLEP mathematics examination.
4. Humanities, 6 hours in (a) EH 205 and EH 206 or (b) English, modern foreign languages, philosophy, music, or art courses or examinations or (c) CLEP humanities examination.

To continue studies toward the baccalaureate students should select general education courses that also apply toward the requirements for the higher degree. In each of the above groups, the courses listed as “(a)” are acceptable in most undergraduate degree programs.

Political Science (PSC)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>American Government</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>102</td>
<td>Problems in Politics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>221</td>
<td>State and Local Government</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>223</td>
<td>Alabama and Southern Politics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>235</td>
<td>Introduction to Comparative Government</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>246</td>
<td>Introduction to International Relations</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>271</td>
<td>Introduction to American Legal System</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>280</td>
<td>Special Topics in Political Science</td>
<td>1-3 hrs.</td>
</tr>
<tr>
<td>307</td>
<td>Congress and State Legislatures</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>308</td>
<td>American Presidency</td>
<td>3 hrs.</td>
</tr>
</tbody>
</table>


Outstanding problems now confronting government in foreign and domestic policy.

Introduction to state and local politics in America. Different governmental forms and their impact on public policies.

Surveys the government and politics of Alabama and provides an overview of the political culture in the American South.

Surveys the political cultures, governmental structures, and contemporary policy problems of parliamentary, communist and third world political systems.

Examination of the basic factors underlying the conduct of international relations focusing upon the forces affecting the change and direction of the present state system. Special attention is given to the forces affecting war and peace.

Structure, jurisdiction, procedures, and impact of the courts in administration of justice. Focus on the roles of the major participants in the legal system. Both criminal and civil justice topics are covered. (Same as CJ 271.)

Study of selected topics in local, state, national and world politics.

The American legislative process. Institutional setting and process of decision-making, recruitment and socialization of legislators, and relationships between Congress and the remainder of the political system.

The role of the president in the American political system. Special emphasis is placed upon internal functioning of executive branch of government through analysis of structure and techniques of the national administration.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>311</td>
<td>Research and Analysis</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Philosophy and logic of scientific inquiry. Data, bibliographic sources and useful techniques in data analysis, including an introduction to simple computing. Required of all students majoring in political science and criminal justice. (Same as CJ 311). Lab fee: Level 3. Prerequisite: AHS 300.</td>
<td></td>
</tr>
<tr>
<td>316</td>
<td>Classical Political Philosophy</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Historical survey and philosophical analysis of fundamental ideas of representative thinkers in western political theory to Machiavelli. (Same as PHL 316)</td>
<td></td>
</tr>
<tr>
<td>317</td>
<td>Modern Political Philosophy</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Historical survey and philosophical analysis of fundamental ideas of representative thinkers in western political theory from Machiavelli. (Same as PHL 317)</td>
<td></td>
</tr>
<tr>
<td>318</td>
<td>American Political Thought</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Main currents in American political thought from its European antecedents to contemporary times.</td>
<td></td>
</tr>
<tr>
<td>323</td>
<td>American Federalism</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Function and importance of federalism and intergovernmental relations in the American political system. Role of the state, local and regional governments as partners in the federal arrangement.</td>
<td></td>
</tr>
<tr>
<td>336</td>
<td>Parliamentary Systems</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Introduction to the governments and political systems of western European democracies. Considers their socio-economic contexts and accounts for their similarities and differences in terms of historical and contemporary economic, social, and cultural factors.</td>
<td></td>
</tr>
<tr>
<td>337</td>
<td>Communist Systems</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Examination of Marxist theory in various national settings. Attention is focused on evolution of Communist regimes and parties in different states in relation to temporal and environmental challenges.</td>
<td></td>
</tr>
<tr>
<td>338</td>
<td>Third World Systems</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Study of growth and decay of third world nations, their socio-economic problems and their political responses to the requirements of economic and social change.</td>
<td></td>
</tr>
<tr>
<td>343</td>
<td>International Law and Organization</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Contribution of international law and organization to world order since World War II. Role of the United Nations in the third world and to political and sociological origins of international law and its application to selected contemporary problems.</td>
<td></td>
</tr>
<tr>
<td>350</td>
<td>Public Administration</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Administrative principles and practices in public organizations and agencies.</td>
<td></td>
</tr>
<tr>
<td>365</td>
<td>Public Opinion and Elections</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Examination of theories of electoral behavior and their utility in understanding voter decision making. The formulation, manipulation, and impact of public opinion on American politics are assessed.</td>
<td></td>
</tr>
<tr>
<td>369</td>
<td>Political Parties and Interest Groups</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Reviews the roles of two major &quot;linkage&quot; institutions in U.S. politics. Considers the organizational features of these institutions and their impact upon the electoral and policy making processes.</td>
<td></td>
</tr>
<tr>
<td>371</td>
<td>American Constitutional Law</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>The policy-making role of the Supreme Court in the American political system through analysis of leading cases in interpreting the constitution.</td>
<td></td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>399</td>
<td>Directed Study in Political Science</td>
<td>1-3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Independent studies in an area of political science selected in consultation with faculty advisor. Approval of chairman required.</td>
<td></td>
</tr>
<tr>
<td>423</td>
<td>Urban Politics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Examination of urban politics in America with attention given to urban problems, urban environment, governmental forms, power structures, and policy outputs.</td>
<td></td>
</tr>
<tr>
<td>450</td>
<td>Public Bureaucracy</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>An examination of the institutional and environment factors shaping governmental bureaucracy and the application of private organizational theory to the bureaucracy.</td>
<td></td>
</tr>
<tr>
<td>465</td>
<td>American Foreign Policy</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Study of the institutions, processes and personalities affecting the formation of American foreign policy.</td>
<td></td>
</tr>
<tr>
<td>471</td>
<td>Civil Liberties</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Judicial interpretations of contemporary questions involving rights of individuals and limits of freedom of action in American society.</td>
<td></td>
</tr>
<tr>
<td>480</td>
<td>Special Topics in Political Science</td>
<td>1-3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Study of selected topics in local, state, national and world politics.</td>
<td></td>
</tr>
<tr>
<td>495</td>
<td>Internship in Government</td>
<td>1-6 hrs.</td>
</tr>
<tr>
<td></td>
<td>Undergraduates may receive from one to 6 hours of academic credit for an internship with local, state, or federal governmental agencies. Students must attend internship seminars, keep a log of activities, and submit a report on their internship.</td>
<td></td>
</tr>
<tr>
<td>580</td>
<td>Special Topics in Political Science</td>
<td>1-3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Study of selected topics in local, state, national and world politics.</td>
<td></td>
</tr>
<tr>
<td>598</td>
<td>Studies in Public Administration</td>
<td>1-3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Special studies and projects in Public Administration.</td>
<td></td>
</tr>
<tr>
<td>599</td>
<td>Studies in Political Science</td>
<td>1-3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Special studies and projects in political science. Approval of chairman required.</td>
<td></td>
</tr>
</tbody>
</table>

Courses listed below are primarily for graduate students in the Administrative Science Program.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>620</td>
<td>Intergovernmental Relations</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Intergovernmental relations in the U.S. Specific government programs are discussed in terms of funding arrangements, policy decisions, and program administration.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Introduction to public management as a field of study and practice. Review of basic literature. Emphasis on ethics in public service.</td>
<td></td>
</tr>
<tr>
<td>652</td>
<td>Public Personnel Administration</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Purposes, functions, and processes of personnel management at the national, state, and local levels.</td>
<td></td>
</tr>
<tr>
<td>655</td>
<td>Budgetary Process</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Governmental revenue and expenditure policies. Budget as a method of administrative and fiscal control.</td>
<td></td>
</tr>
<tr>
<td>660</td>
<td>Public Policy Determination</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Study of economic, political, social, and institutional factors which influence the policy making process and the impact of policy decisions made by the national, state, and local levels of government. Examination of the steps in policy-program analysis and evaluation.</td>
<td></td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Hours</td>
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<tr>
<td>-------------</td>
<td>-----------------------------------------------------------</td>
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</tr>
<tr>
<td>678</td>
<td>Administrative Law and Regulations</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Judicial influences and controls on exercise of administrative authority with analysis of governmental regulatory policies.</td>
<td></td>
</tr>
<tr>
<td>680</td>
<td>Special Topics in Public Administration</td>
<td>1-3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Study of selected current issues in Public Administration.</td>
<td></td>
</tr>
<tr>
<td>695</td>
<td>Internship in Government</td>
<td>1-6 hrs.</td>
</tr>
<tr>
<td></td>
<td>Graduate students may receive from one to 6 hours of academic credit for an internship with local, state, or federal governmental agencies. Students must attend internship seminars, keep a log of activities, and submit a report on their internship.</td>
<td></td>
</tr>
</tbody>
</table>

**Criminal Justice (CJ)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Introduction to the American Criminal Justice System</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Survey of the criminal justice system, including philosophical and historical background.</td>
<td></td>
</tr>
<tr>
<td>201</td>
<td>Criminal Investigation</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Techniques, methods, and procedures used in investigation of crime.</td>
<td></td>
</tr>
<tr>
<td>203</td>
<td>Introduction to Criminalistics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Survey of the scientific approaches to criminal investigation. Laboratory operations and techniques. Lab fee: Level 2.</td>
<td></td>
</tr>
<tr>
<td>205</td>
<td>Introduction to Security</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Survey of the scope of the security administration field in business, industry, and government.</td>
<td></td>
</tr>
<tr>
<td>271</td>
<td>Introduction to the American Legal System</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Structure, jurisdiction, procedures, and impact of the courts in administration of justice. Focus on the roles of the major participants in the legal system. Both criminal and civil justice topics are covered. (Same as PSC 271)</td>
<td></td>
</tr>
<tr>
<td>301</td>
<td>Juvenile Delinquency</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Detailed study of delinquency in the United States. Procedural and substantive aspects of the juvenile justice system.</td>
<td></td>
</tr>
<tr>
<td>302</td>
<td>Correctional Counseling Supervision</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Analysis, selection, and implementation of treatment approaches and techniques used with offenders in probation, parole, and corrections.</td>
<td></td>
</tr>
<tr>
<td>303</td>
<td>Criminal Law</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Substantive criminal law, including sources, principles, types of offenses, and responsibility.</td>
<td></td>
</tr>
<tr>
<td>304</td>
<td>Criminal Procedure</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Procedure that controls judicial process in criminal cases from arrest to review of convictions, including consideration of constitutional rights and limitations.</td>
<td></td>
</tr>
<tr>
<td>305</td>
<td>Probation, Parole, and Community Corrections</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Analysis and evaluation of various methods of community-based correctional treatment, including work-release, group homes, probation, and parole.</td>
<td></td>
</tr>
<tr>
<td>311</td>
<td>Research and Analysis</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Philosophy and logic of scientific inquiry. Data, bibliographic sources and useful techniques in data analysis, including an introduction to simple computing. Required of all students majoring in political science and criminal justice. (Same as PSC 311). Lab fee: Level 3. Prerequisite: AHS 300.</td>
<td></td>
</tr>
<tr>
<td>Course</td>
<td>Title</td>
<td>Credits</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------------------------------------</td>
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</tr>
<tr>
<td>320</td>
<td>Criminal Behavior</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>399</td>
<td>Directed Study in Criminal Justice</td>
<td>1-3 hrs.</td>
</tr>
<tr>
<td>420</td>
<td>Corrections and Rehabilitation</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>495</td>
<td>Criminal Justice Internship</td>
<td>1-6 hrs.</td>
</tr>
</tbody>
</table>
Psychology Department

Professor Rogers; Associate Professors Coffield, Hays, James, Sullins (chairman); Associate Professor of Human Development Kirkpatrick.

General Education Requirements

The 6 hour Social Sciences GER may be satisfied by taking PY 103 and any one of the following: PY 113, PY 207, PY 315, or PY 375.

Area of Concentration (AOC) with Psychology Major

A student who majors in psychology must include a minimum of 36 semester hours in psychology with at least 15 hours of these courses numbered 300 or above. Required courses are PY 103, 230, 302, 426, AHS 300, and one human research course.

The psychology major described above will form a part of an AOC which must include one of the following variations: (1) an established minor from one department now offering a major that includes a minimum of 21 semester hours, 6 hours of which must be numbered 300 or above; (2) a minor from a discipline other than those currently offering a major that includes a minimum of 21 semester hours, 6 hours of which must be numbered 300 or above; (3) an area of cognate studies from two or more disciplines that include a minimum of 21 semester hours, 9 hours of which must be in courses numbered 300 or above.

A student planning to major in psychology should take PY 103 and 230 before entering more advanced courses. As soon as these courses are completed, the student should seek advice in planning an AOC from a faculty member in the Psychology Department.

A composite major with emphasis in human growth and development may be earned in conjunction with the Departments of Sociology and Psychology, and the Developmental Learning Program.

Psychology for Second Area of Study

A student majoring in elementary education may choose psychology as his second area of study. See major requirements in Education section.

To meet university requirements, a student should select a minimum of 18 hours, 15 of which must be upper level, from courses listed below with the help of the psychology education faculty adviser and approval of the chairman of the Department of Psychology. This curriculum may require more than the minimum total of 128 hours for the degree.

Psychology Minor

A student using psychology as a minor (variation No. 1 above) must include 21 hours of psychology courses, including PY 103, 230 or AHS 300, and either PY 302 or one human research course. Appropriate psychology courses may also form part of an area of cognate studies with other disciplines to support the student's major. Such a program must be approved by the chairman of the student's major department and must meet requirements established in variation No. 3 above.
### Psychology (PY)

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Hours</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>103</td>
<td>General Psychology</td>
<td>3</td>
<td>Empirical findings of major areas of psychology. General methodology, development, personality, and abnormal and social psychology.</td>
</tr>
<tr>
<td>113</td>
<td>Principles of Behavioral Analysis</td>
<td>3</td>
<td>Principles governing relationship between behavior and environment. Reinforcement, extinction, discrimination, and chaining.</td>
</tr>
<tr>
<td>207</td>
<td>Psychology of Personal Adjustment</td>
<td>3</td>
<td>Application of basic principles in psychology to origin and resolution of personal conflicts. Prerequisite: PY 103.</td>
</tr>
<tr>
<td>230</td>
<td>Decision Statistics</td>
<td>3</td>
<td>Scales of measurement and their properties and distributions as representations of observable events, probabilities derived from empirical frequency samples, statistical description of multivariate phenomena, and rational selection of numeric representations of the real world.</td>
</tr>
<tr>
<td>302</td>
<td>Experimental Psychology</td>
<td>4</td>
<td>Design and execution of experiments in psychology. Research in the areas of learning and cognition or perception. Course includes laboratory. Fee: Level 3. Prerequisite: 6 hours PY and PY 230.</td>
</tr>
<tr>
<td>311</td>
<td>Individual Differences</td>
<td>3</td>
<td>Factors, both learned and innate, that lead to individually unique patterns of behavior. Prerequisite: PY 103.</td>
</tr>
<tr>
<td>313</td>
<td>Psychometrics</td>
<td>3</td>
<td>Theory and practice within psychological testing. Prerequisite: PY 103, AHS 300.</td>
</tr>
<tr>
<td>315</td>
<td>Developmental Psychology I: Theories and Principles</td>
<td>3</td>
<td>General theories and experimental findings about the sensory-motor, cognitive, emotional and moral growth and learning of individuals. Prerequisite: PY 103.</td>
</tr>
<tr>
<td>316</td>
<td>Developmental Psychology II: Stages of Development</td>
<td>3</td>
<td>The process of development as seen at transitional periods of the individual's growth. Particular emphasis is given to adolescence. Prerequisite: PY 315 or approval of instructor.</td>
</tr>
<tr>
<td>330</td>
<td>Psychology of Communication</td>
<td>3</td>
<td>Theories, problems, and research in areas of interpersonal, nonverbal, and mass communication, formulating a psychological conception of man as an information-gathering and information-processing system. Empirical findings of modes, media, and effects of various communication forms. Prerequisite: PY 103. (Same as CM 330).</td>
</tr>
<tr>
<td>375</td>
<td>Social Psychology</td>
<td>3</td>
<td>The fundamental principles of group behavior. Development of group solidarity, cohesion, intergroup conflict and cooperation, and effects of different patterns of leadership. Prerequisite: SOC 100 or PY 103. (Same as SOC 375).</td>
</tr>
<tr>
<td>390</td>
<td>Readings in Psychology</td>
<td>3</td>
<td>Supervised in-depth readings in area of particular interest to student. Prerequisite: 15 hours PY and approval of instructor. May be taken twice for credit.</td>
</tr>
<tr>
<td>391</td>
<td>Special Topic in Psychology</td>
<td>1</td>
<td>Study of preannounced special areas in seminar discussion, laboratory work, or practicum. Prerequisite: 15 hours PY. May be taken twice for credit.</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
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</tr>
<tr>
<td>392</td>
<td>Special Topic in Psychology</td>
<td>2 hrs.</td>
<td>Study of preannounced special areas in seminar discussion, laboratory work, or practicum. Prerequisite: 15 hours PY. May be taken twice for credit.</td>
</tr>
<tr>
<td>401</td>
<td>Personality</td>
<td>3 hrs.</td>
<td>Examination of various theories of personality with possible implications for research. Prerequisite: PY 103.</td>
</tr>
<tr>
<td>411</td>
<td>Human Research: Motivation and Emotion</td>
<td>4 hrs.</td>
<td>Motivational and emotional dynamics relating to stress, depression, anxiety, and pleasure. Includes laboratory. Fee: Level 3. Prerequisite: 9 hours PY.</td>
</tr>
<tr>
<td>413</td>
<td>Human Research: Applied Social Psychology</td>
<td>4 hrs.</td>
<td>Topics in social psychology as applied to situations of practical interest. Includes laboratory. Fee: Level 3. Prerequisite: PY/SOC 375.</td>
</tr>
<tr>
<td>420</td>
<td>Seminar in Psychology</td>
<td>3 hrs.</td>
<td>Presentation and discussion of reports on psychological problems within a particular area. Prerequisite: 15 hours PY and approval of instructor. May be taken twice for credit.</td>
</tr>
<tr>
<td>422</td>
<td>Individual Research</td>
<td>3 hrs.</td>
<td>With advice of instructor, design and execution of original experiment in psychology. Prerequisite: 15 hours PY and approval of instructor. May be taken twice for credit.</td>
</tr>
<tr>
<td>426</td>
<td>History and Systems in Psychology</td>
<td>3 hrs.</td>
<td>History of psychology as it has led to development of systematic study within the field. Prerequisite: 15 hours PY.</td>
</tr>
<tr>
<td>433</td>
<td>Abnormal and Health Psychology for the Human Service Professions</td>
<td>3 hrs.</td>
<td>Individual patterns and social contexts of integrative and maladaptive emotions and behavior. Prerequisite: PY 103.</td>
</tr>
<tr>
<td>435</td>
<td>Theory of Abnormal Psychology</td>
<td>3 hrs.</td>
<td>Major behavior exceptionalities, with emphasis on empirical findings. Prerequisite: PY 401 or approval of instructor.</td>
</tr>
<tr>
<td>436</td>
<td>Physiological Psychology</td>
<td>3 hrs.</td>
<td>Neural and endocrinological systems underlying behavior. Prerequisite (either a or b): (a) 15 hours of PY or approval of instructor; (b) BYS 114 or BYS 313 and 6 hours of PY or approval of instructor. (Same as BYS 436).</td>
</tr>
<tr>
<td>437</td>
<td>Symbolic Process</td>
<td>3 hrs.</td>
<td>Cognitive phenomena, including topics in psychology of language, imagination, and other complex information-processing. Prerequisite: PY 302.</td>
</tr>
<tr>
<td>502</td>
<td>Industrial and Organizational Psychology</td>
<td>3 hrs.</td>
<td>Application of basic principles of learning, motivation, and perception to typical industrial and organizational problems.</td>
</tr>
<tr>
<td>503</td>
<td>Advanced General Psychology</td>
<td>3 hrs.</td>
<td>Survey. Various major areas of psychology. Open only to senior psychology majors. Prerequisite: 24 hours PY and senior standing.</td>
</tr>
</tbody>
</table>
506 Language Development  
3 hrs.
Stages of language development and techniques for stimulating language development and communication skills in the young child. Includes practicum.

510 Analytical Implementation of Principles of Psychology  
5 hrs.
Critical examination of role of social scientist, particularly with respect to function of application of principles of social science. In-depth readings and discussions with examples by students in context of meaningful practical experience. Prerequisite: senior or graduate standing or approval of instructor.

528 Human Learning Theory  
3 hrs.
Critical examination of behavioral changes commonly called "learning," as well as closely related behavioral phenomena such as transfer, retention, and stimulus generalization.

529 Behavior Modification  
3 hrs.
Psychological principles concerning control of human behavior and current theoretical and experimental research in behavior modification.

530 Statistics and Methodology  
3 hrs.
Experimentation, data presentation and analysis, and research report writing. Inferential statistics. Includes laboratory.

531 Individual Mental Testing: Stanford-Binet  
3 hrs.
Various assessment techniques; particular emphasis on Stanford-Binet. Use of theory and practice. Includes laboratory. Fee: Level 3. Prerequisite: approval of instructor.

532 Individual Mental Testing: Wechsler  
3 hrs.
Individual testing with Wechsler tests, along with practical experience. Includes laboratory. Fee: Level 3. Prerequisite: PY 531.
Sociology Department

Associate Professors Haralick, Hodges, Tarter; Assistant Professors Chang, Finley, Grzyb; (Acting chairman, Sullins.)

Area of Concentration (AOC) with Sociology Major

Requirements for a major are 36 hours of sociology including SOC 100, 102, 300, 465, and AHS 300. A minimum of 15 hours should be taken in courses numbered 300 or above.

Up to 6 hours of the 36 hours required for major may be satisfied by related courses in disciplines other than sociology. These courses must relate to a specific area of interest within the major and such courses may count toward the major only with approval of student’s faculty adviser.

A composite major with emphasis in human growth and development may be earned in conjunction with the Departments of Sociology and Psychology, and Developmental Learning Program.

A student developing a minor in sociology with a major in another discipline must complete 21 hours of sociology courses including SOC 100 and 102. A minimum of 9 hours should be in courses numbered 300 or above. Supportive cognate studies that involve combinations of courses from disciplines other than sociology should be worked out with advice of sociology faculty.

The Sociology Department is developing an applied program relating coursework to community agencies with possible internship. Consult department for details.

Students majoring in elementary education may select sociology as their second area of study. See major requirements in Education section. State-approved requirements for education cannot be finalized at this writing. They will be published as soon as available.

To meet university requirements, select a minimum of 18 hours, 15 of which must be upper level from courses listed below with help of education faculty adviser and approval of chairman of the Department of Sociology. The following courses are especially useful for teachers: SOC 100, 102, 106, 305, 306, 310, 325, 330, 375, 452, and 490. This curriculum may require more than minimum total of 128 hours for the degree.

<table>
<thead>
<tr>
<th>Sociology (SOC)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>100 Introduction to Sociology</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>Perspective methods, concepts, and general findings of the sociologist. Historical and conceptual development of sociology.</td>
<td></td>
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<tr>
<td>102 Analysis of Social Problems</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>Sociological interpretation of contemporary social problems as they relate to significant trends in complex societies.</td>
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<tr>
<td>106 Marriage and Family</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>The family as a social institution, its structure and function in contemporary societies, dating, marital interaction, life cycle, and socialization process.</td>
<td></td>
</tr>
<tr>
<td>Mass communication theory, history of American mass media, and criticism of contemporary forms and functions of mass media of communication in the United States. (Same as CM 130).</td>
<td></td>
</tr>
</tbody>
</table>
Cultural Anthropology 3 hrs.
Origin and development of man's ways of life. Analysis of preliterate societies.

Introduction to Social Work 3 hrs.
Social case work, methods, functions, and services. Principal fields and areas of social work. No prerequisite.

Upper-division sociology courses are open to students who have taken SOC 100 and SOC 102 or have taken SOC 100 and have approval of instructor.

Research Methods 3 hrs.
Broad and balanced background in various types of social research methods. Fundamental logic and specific techniques in conducting research. AHS 300 is helpful but not required.

Urban Sociology 3 hrs.
Origin and growth of cities, demographic and spatial characteristics of communities, attitude and value systems in urban society, and impact of urbanization on institutional structures.

Sex Roles 3 hrs.
Social and sexual roles, their interrelationships, and articulation with societal institutions and agencies. Social upheaval that is both cause and effect of sex-role changes in societies in transition.

Sociology of Childhood 3 hrs.
Environmental influences on socialization of infants and children. Various family roles, the school, peer group, and culture as they affect the growing child and early adolescent.

Life Span Development 3 hrs.
Major social influences on human development, change, continuity, and discontinuity from birth to old age. Turning points and role throughout life span. Prerequisite: SOC 310.

Population and Ecology 3 hrs.
Growth and distribution of world population and environmental problems created in relation to population growth.

Deviance and Social Control 3 hrs.
Social construction of deviant behavior and societal reactions to it.

Criminal Behavior 3 hrs.
Criminal behavior and criminal control procedures. Causation, criminal, and chancery laws, and crime control by police and criminal or juvenile courts. (Same as CJ 320).

The Sociology of Education 3 hrs.
Education as a social institution; its structure, function, and role in contemporary life. (Same as ED 325).

Minority Groups 3 hrs.
Nature of minorities: status differentiation and group structure, institutional trends, and intergroup relations.

Sociology of the South 3 hrs.
The contemporary South focusing on unique social processes and cultural heritage leading to its development. Cultural diversity that underlies the belief systems of Southerners.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>340</td>
<td>Special Topics</td>
<td>1-3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Nontraditional topics of current sociological interest. Title of course and number of credit hours when offered, will appear in course schedule along with prerequisites necessary for admission to course. Course may be taken more than once for credit as long as subtitles differ.</td>
<td></td>
</tr>
<tr>
<td>345</td>
<td>Social Gerontology</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Theoretical and empirical approach to human aging process with its various social and cultural aspects. Major problems and issues in aging and current programs designed to meet needs of the elderly.</td>
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<tr>
<td>350</td>
<td>Social Stratification</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Social class, social status, and social mobility. Social power and prestige. Differential opportunities and resultant behaviors of upper, middle, and lower social classes.</td>
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<tr>
<td>359</td>
<td>Social Foundations of Revolutionary Change</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Role of revolution, violence, and extremist politics in social and political process. Major focus on American social movements.</td>
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</tr>
<tr>
<td>375</td>
<td>Social Psychology</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Fundamental principles of group processes, social influence, and group structure. Development of group solidarity, cohesion, intergroup conflict and cooperation, communication, leadership, opinion, propaganda, and suggestion. Prerequisite: PY 103 or SOC 100. (Same as PY 375).</td>
<td></td>
</tr>
<tr>
<td>385</td>
<td>Complex Organization</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Theory and structure of past and present complex organization on the large social structure. Military, industrial, and political bureaucracies.</td>
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</tr>
<tr>
<td>390</td>
<td>Readings and Individual Research</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Supervised readings or in-depth research or both in area of specialized interest to student or instructor. Permission of instructor. May be taken twice for credit with adviser's approval.</td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>Applied Research Methods</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Fundamental procedures of planning and conducting applied research such as policy or program evaluation and secondary data analysis. Experimental designs, ethics in research and cost-benefit, cost-effective techniques. SOC 300 and AHS 300 helpful but not required. By invitation or approval of instructor.</td>
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</tr>
<tr>
<td>420</td>
<td>The Sociology of Corrections and Rehabilitation</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Social variables in restructuring behavior of social offender. Basic problems faced by correctional institutions. (Same as CJ 420).</td>
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<tr>
<td>440</td>
<td>Sociology of Religion</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Sociological principles applied to religious institutions; interaction of religion and society. Sects and cults, the religious commune, religion and social change, and contemporary religious issues.</td>
<td></td>
</tr>
<tr>
<td>450</td>
<td>Medical Sociology</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Relationship of sociology and social psychology to medicine. Role and status of medical and paramedical personnel in the United States; Health-care delivery systems and problems encountered.</td>
<td></td>
</tr>
<tr>
<td>452</td>
<td>Sociology of Mental Health</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Social construction of mental health and mental illness. Mental hospitals, community mental health center, and mental health movement.</td>
<td></td>
</tr>
</tbody>
</table>
455 Sociology of Work and Occupations 3 hrs.
Contemporary work situations and experiences. Alienation in work, impact of technological change and bureaucratization, primary work groups and work culture, professionalization, unionization, workers' self-management experiments, and work-leisure relationship.

465 Sociological Theory 3 hrs.
Development of discipline of sociology in terms of major trends of sociological theory, past and present, and major theoretical problem areas. Nature of sociological theory in relation to other disciplines. Prerequisite: SOC 100, 102, and junior or senior standing.

480 The Sociology of the Future 3 hrs.
Major social trends that leading forecasters project for the next twenty-five years. Nature, methods, and outlook of modern social and technical forecasters. (A course for a variety of students. SOC 100 helpful but not required.)

490 Sociology of Poverty and Deprivation 3 hrs.
Poverty and deprivation as variables in social life. Social and psychological effects of deprivation and nature and effectiveness of programs to combat it. Offered on demand.

630 Industrial Sociology 3 hrs.
Development of modern work relations in an historical and dialectical framework. Consequences of modern work relations on cultural values such as democracy and individuality. Alternative work relations with attention to industrial sociology.
School of Engineering

Dean Richard G. Griskey, B.S., M.S., Ph.D., P.E. Professor of Chemical Engineering

Chemical Engineering
Professor Griskey; Associate Professor Curry; Assistant Professor Smith

Civil Engineering
Professor Hackett; Professor Emeritus Kubitza

Electrical and Computer Engineering
Professors Adams, Audeh, Dowdle, Halijak, Johnson, Kheir, Polge (chairman); Adjunct Professor O’Reilly; Associate Professors Ho, Thurstone; Assistant Professors Greene, Marr, Mohadjer

Industrial and Systems Engineering
Professors Black (chairman), Brown, Shannon, Wyskida; Associate Professor Walker; Adjunct Associate Professor Lowe; Assistant Professor Perez

Mechanical Engineering
Professors Chung, Cogley (chairman), Hung, Liu, Shih, Wu; Professor Emeritus Hermann; Associate Professors Brainerd, Karr, Thompson, Wallace.

Engineering is the profession that translates scientific thought into reality. By combining synthesis, analysis and design in creative and innovative modes the engineer produces systems, processes and products for the benefit of the human race. Those who desire to be part of this important effort can gain entry into the engineering profession by attending UAH.

The UAH School of Engineering is not only located in an urban area but also in the state’s high technology area. Close proximity to the Marshall Space Flight Center, Redstone Arsenal and much of Alabama’s fastest growing technological industry gives the School of Engineering a special character that leads to outstanding educational opportunities for its students. This special setting combined with a high quality faculty affords maximum growth potential for those desiring to pursue a career in engineering.
The UAH School of Engineering has made a strong commitment to the advising of both undergraduate and graduate students. As such, students are requested to contact the Dean’s Office as soon as possible to be assigned an adviser.

Degrees and Programs

Bachelor of Science in Engineering degrees can be earned in chemical engineering, civil engineering, electrical and computer engineering, industrial and systems engineering and mechanical engineering. The undergraduate engineering programs are built around a core consisting of courses in mathematics, the physical sciences, humanities and engineering. Students then take additional engineering courses in the areas of their specializations. The net result is that at UAH, engineering students first develop breadth in important fundamental areas and then depth in their particular field of specialization. This gives an added dimension to UAH engineering graduates that enhances their professional performance. The UAH engineering student is also able to obtain real world engineering experience through the Cooperative Education Program or by part-time work with the many governmental and industrial facilities in Huntsville.

Graduate degrees offered in engineering include the Master of Science in Engineering for electrical, industrial and systems engineering, and mechanical engineering, a Master of Science in Operations Research and the Ph.D. in electrical, industrial and systems, and mechanical engineering. Interaction with the high technology area of Huntsville strongly enhances the high quality engineering graduate programs and thereby offers the candidate a degree that has added significance.

When desirable, as evidenced from continuous studies, the School of Engineering may modify its curricula and specific courses of instruction, alter requirements for admission or for graduation, and change degrees to be awarded.

Requirements for an Engineering Minor

Students with nonengineering majors who choose a minor in engineering, must take a minimum of 21 hours in engineering courses selected with the assistance of an engineering adviser and approved by the chairman of one of the engineering departments.

Course Numbers

Course numbers are coded for engineering courses so the second digit indicates the option as follows:

<table>
<thead>
<tr>
<th>Middle Digit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical and Computer Engineering</td>
</tr>
<tr>
<td>Industrial and Systems Engineering</td>
</tr>
<tr>
<td>Chemical Engineering</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
</tr>
<tr>
<td>Civil Engineering</td>
</tr>
<tr>
<td>General Engineering</td>
</tr>
</tbody>
</table>
Undergraduate Engineering Program

Bachelor of Science in Engineering Degree Program

The engineering program has as its primary objective the preparation of qualified students for careers in any one of many engineering disciplines, for research, and for advanced studies. It stresses a broad education in mathematics, physical sciences, liberal arts, social sciences, engineering science, and engineering design and synthesis.

The School of Engineering achieves this goal by offering a unified program of undergraduate engineering studies that serve as a foundation for creative participation in most areas of engineering, especially those associated with new evolving technologies. All engineering students follow a common curriculum with specialization in junior and senior years in chemical engineering, civil engineering, electrical and computer engineering, industrial and systems engineering, and mechanical engineering. The electrical and computer engineering, industrial and systems engineering, and mechanical engineering options are accredited by the Accreditation Board of Engineering and Technology (ABET). The other options are under preparation for ABET accreditation evaluation.

A student will be awarded the degree of Bachelor of Science in Engineering upon successful completion of all course work requirement.

High School Preparation, Prerequisite Courses, and Transfer Credit

Students who intend to pursue the B.S.E. degree should carefully read the section Admission to the Freshman Class. Students who have had inadequate preparation or who are placed in certain lower-level classes because of results of placement tests may have to take one or more of the following courses.

- **EH 003 Remedial Writing** ................................ No credit
- **CH 101 General Chemistry** ........................................ 3 hrs.
- **CH 105 General Chemistry Laboratory** ......................... 1 hr.
- **MA 119 Precalculus I** ........................................ 3 hrs.
- **MA 121 Precalculus II** ........................................ 3 hrs.

These courses carry the academic credit indicated and will appear on transcripts of students who successfully complete the courses. Since these courses are prerequisite to courses required for the B.S.E., credit earned in one or more of these courses may not be applied toward the minimum requirement for the B.S.E.

Credit for engineering courses taken in schools with ABET accredited programs is transferrable to UAH. Engineering courses taken in non-ABET accredited programs may also be applied to a B.S.E. degree based on an appropriate examination (written or oral) at the discretion of the respective department. This has been applied to courses taken after September 1, 1979. All inquiries concerning applicability of credit should be made to the UAH engineering department chairman where the course or its equivalent is being taught.

Each student in the School of Engineering, especially those transferring from other institutions, must assume the responsibility for registering for all required courses in their proper sequence and for fulfilling all requirements for admission and graduation. Failure to do so may extend time required for graduation. Student should seek counseling and advice from the appropriate
department or from the office of the dean. A student enrolled in the Bachelor of Science in Engineering programs must successfully complete courses in each of the following six categories:

1. **Engineering core (25 hours):**
   - FORTRAN Programming - EG 197 ........................................... 3
   - Statics - EG 271 .......................................................... 3
   - Nature and Properties of Materials and Lab - EG 294 and 295 ........ 4
   - Electrical Circuits I - EG 300 ......................................... 3
   - Electronic Instrumentation Lab - EG 301 .................................. 1
   - Electronic Instrumentation - EG 311 ................................................ 3
   - Engineering Economy - EG 321 ........................................... 3
   - Dynamics - EG 362 ......................................................... 3
   - Introduction to Engineering Design - EG 493 .............................. 2

2. **English composition - EH 101, 102 ........................................... 6**

3. **Humanities and social sciences (15 hours)**
   Engineering students are required to take a total of 15 semester hours (in addition to EH 101 and 102) in the humanities and social sciences, including EC 142 and AHS 392. The remaining 9 semester hours should be a balanced choice from the following areas: art, literature, history, music, philosophy, sociology, psychology, political science, geography, economics. Out of these nine semester hours, students are advised to take no more than six hours at the 100 level.

   Courses should be elected to fulfill an objective appropriate to the engineering profession. Courses treating subjects such as accounting, industrial management, finance, personnel administration, introductory language, and ROTC normally do not fulfill this objective regardless of their general value in the total engineering curriculum.

4. **Mathematics (18 hours)**
   - Calculus and Analytic Geometry - MA 153, 154, 233, 251 ............. 12
   - Linear Algebra - MA 244 ..................................................... 3
   - Differential Equations - MA 352 ........................................... 3

5. **Basic Sciences (12 and additional hours)**
   - General Physics - PH 111, 112 ........................................... 8
   - Chemistry - CH 121, 125 ................................................... 4
   Additional courses are listed under each option.

6. **Engineering options**
   Students are required to take one of the following options as listed below

   **Chemical Engineering Option.** Chemical engineering deals with any situation in which changes in the chemical composition or the physical state of matter (or both) are involved and, hence, finds unusually wide application. Heat and mass transfer, fluid mechanics, thermodynamics and chemical reaction kinetics constitute the heart of chemical engineering. Chemical engineers work in many diverse fields ranging from production of the many basic chemical products required by our industrial society to research on major technical and social problems, including energy resources development and pollution control.
### Additional Basic Sciences

Chemistry - CH 123, 126, 223, 331, 332, 341, 342, 343 ................. 20

### Chemical Engineering Option

EG 198 - Engineering Graphics ............................................. 2
EG 244 - Stoichiometry ...................................................... 3
EG 341 - Thermodynamics I ................................................. 3
EG 344 - Chemical Engineering Thermodynamics ......................... 3
EG 352 - Fluid Mechanics .................................................... 2
EG 353 - Fluid Mechanics Lab ............................................... 1
EG 396 - Numerical Methods and Computations ............................ 2
EG 440 - Unit Operations Laboratory ....................................... 3
EG 442 - Introduction to Heat and Mass Transfer ......................... 4
EG 443 - Mass Transfer Operations ......................................... 3
EG 447 - Chemical Engineering Design I ................................... 3
EG 448 - Chemical Engineering Design II ................................... 3
EG 487 - Analysis and Control of Dynamical Processes ................... 2
EG 541 - Chemical Kinetics and Reactor Design ........................... 3

### Suggested Schedule of Courses for Full-time Chemical Engineering Students

<table>
<thead>
<tr>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>EH 101</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>MA 153</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>CH 121 &amp; 125</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>EG 198</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>CH 331</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>PH 111</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>MA 251</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>EG 271</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>CH 341</td>
<td>3</td>
<td>2</td>
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<tr>
<td>EG 341</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>EG 294 &amp; 295</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>EG 396</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>EG 311 &amp; 301</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>EG 443</td>
<td>3</td>
<td>3</td>
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<tr>
<td>EG 493</td>
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<td>EG 487</td>
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<td>11</td>
<td>12</td>
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</tbody>
</table>

*HU/SS: 9 hours in humanities/social sciences

Total Hours 133
Civil Engineering Option. Civil engineers plan, design, construct, maintain and operate public and private facilities. Included are transportation systems, bridges, and buildings, water supply, pollution control, irrigation and drainage systems, river and harbor improvement, and dams and reservoirs.

Additional Basic Sciences
Chemistry - CH 123, 126 ....................................... 4

Civil Engineering Option
EG 172 - Surveying I .......................................... 2
EG 173 - Surveying II ........................................ 2
EG 198 - Engineering Graphics .................................. 2
EG 341 - Thermodynamics I .................................... 3
EG 352 - Fluid Mechanics ....................................... 2
EG 353 - Fluid Mechanics Lab ................................ 1
EG 370 - Mechanics of Materials .................................. 3
EG 371 - Structural Analysis I .................................. 3
EG 372 - Soil Mechanics and Foundations ......................... 3
EG 373 - Reinforced Concrete Design .............................. 3
EG 374 - Elements of Structural Design ......................... 3
EG 379 - Mechanics of Materials Lab ............................ 1
EG 390 - Probability and Engineering Statistics I ................. 3
EG 396 - Numerical Methods and Computations .................. 2
EG 471 - Structural Analysis II ................................ 3
EG 472 - Hydraulic Engineering ................................... 3
EG 473 - Transportation Engineering and Design ................. 3
EG 475 - Hydrology ................................................ 2
EG 476 - Sanitary Engineering ................................... 3
EG 477 - Civil Engineering Project I ............................. 1

* Technical Electives ........................................... 7

* Choose from EG 375, 376, 396, 478, 549, 554, 561, 571, 572, 396 or from upper-level courses approved by the Civil Engineering program chairman.

Suggested Schedule of Courses for Full-time Civil Engineering Students

<table>
<thead>
<tr>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH 121 &amp; 125</td>
<td>4 CH 123 &amp; 126</td>
<td>4 EH 102</td>
</tr>
<tr>
<td>MA 153</td>
<td>3 EH 101</td>
<td>3 MA 233</td>
</tr>
<tr>
<td>EG 197</td>
<td>3 MA 154</td>
<td>3 PH 111</td>
</tr>
<tr>
<td></td>
<td>2 EG 198</td>
<td>2 EG 172</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>12</td>
</tr>
</tbody>
</table>

*Hu/SS 3 MA 244 3 *Hu/SS 3
MA 251 3 EG 271 3 EC 142 3
PH 112 4 EG 294 & 295 4 MA 252 3
EG 173 2 EG 362 3

12 10 12 34

(continued on page 228)
(continued from page 227)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EG 300</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>EG 341</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>EG 370 &amp; 379</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>EG 396</td>
<td></td>
<td>2</td>
</tr>
</tbody>
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<table>
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<tr>
<td>*Hu/SS</td>
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Electrical and Computer Engineering Option. The electrical and computer engineering option offers a background that enables a student to pursue careers in any of the many and diverse facets of electrical and computer engineering such as electronics, network, power systems, instrumentation, computers, communications, and controls. The student may also select advanced undergraduate courses to develop individual and specific interests.

Semester Hours

<table>
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<tr>
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<tbody>
<tr>
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<td>EG 487</td>
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</table>

* Choose from EG 402, 407, 411, 414, 416, 501, 502, 503, 504, 505, 506, 509, 516, or other upper-level courses approved by the Department of Electrical and Computer Engineering.
Suggested Schedule of Courses for Full-time Electrical and Computer Engineering Students

<table>
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<tr>
<td></td>
<td>129</td>
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</tr>
</tbody>
</table>

*Hu/SS: 9 hours in humanities/social sciences

**Engineering Core: 25 hours are common to all engineers.

**Industrial and Systems Engineering Option.**

Industrial and systems engineering is concerned primarily with integration of people, machines and materials and operating procedures into a functional and economic whole called a system. Thus the specialization includes consideration not only of the usual engineering science, but also requires some knowledge of social, psychological, and human values to identify and satisfy needs of ultimate users of engineering systems.
### Additional Basic Sciences

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
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<tbody>
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### Industrial Engineering Option

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<td>EG 220 - Production and Operation Systems I</td>
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<tr>
<td>EG 320 - Production and Operation Systems II</td>
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<tr>
<td>EG 370 - Mechanics of Materials</td>
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<td>EG 379 - Mechanics of Materials Lab</td>
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<td>EG 390 - Probability and Engineering Statistics I</td>
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<tr>
<td>EG 421 - Probability and Engineering Statistics II</td>
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<tr>
<td>EG 427 - Management Systems Analysis</td>
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<tr>
<td>EG 428 - Systems Analysis and Design I</td>
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<tr>
<td>EG 429 - Systems Analysis and Design II</td>
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<tr>
<td>EG 487 - Analysis and Control of Dynamical Processes</td>
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</tr>
<tr>
<td>EG 524 - Introduction to Ergonomics: Work Development</td>
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<tr>
<td>AC 211 - Accounting I</td>
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<td>Industrial Engineering Electives</td>
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<tr>
<td>* Technical Electives</td>
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</tbody>
</table>

* Choose from EG 202, 303/313, 305/315, 341, 352/353, 378, 381, 396, 488, 501, or other upper-level courses approved by the Department of Industrial and Systems Engineering.

### Suggested Schedule of Courses for Full-time Industrial and Systems Engineering Students

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<tr>
<th>Fall</th>
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<td>MA 153</td>
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<table>
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<th>Winter</th>
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<tbody>
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<td>MA 251</td>
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<td>EG 294 &amp; 295</td>
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<tr>
<td>EG 220</td>
<td>EG 321</td>
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<td>MA 352</td>
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<td>EG 300</td>
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</tbody>
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*Hu/SS: 9 hours in humanities and social sciences.

(continued on page 231)
Mechanical Engineering Option.
Mechanical engineering is a broad field that traditionally comprises three primary subfields: energy, mechanisms and machinery, and manufacturing. The work done by mechanical engineers includes the design, construction, and use of systems for the conversion of energy available from natural sources (water, fossil fuels, nuclear fuels, solar radiation) to other forms of useful energy (for transportation, heat, light, power); design and production of machines to lighten the burden of servile human work and to do work otherwise beyond human capability; processing of materials into useful products; and creative planning, development, and operation of systems using energy, machines, and resources.

Additional Basic Sciences
Chemistry - CH 123, 126 ........................................... 4

Mechanical Engineering Option
EG 198 - Engineering Graphics ..................................... 2
EG 341 - Thermodynamics I ......................................... 3
EG 342 - Thermodynamics II ......................................... 3
EG 352 - Fluid Mechanics ........................................... 2
EG 353 - Fluid Mechanics Lab I .................................... 1
EG 364 - Kinematics and Dynamics of Machines ................ 4
EG 370 - Mechanics of Materials ................................... 3
EG 379 - Mechanics of Materials Lab .............................. 1
EG 378 - Materials and Manufacturing Processes ............... 3
EG 396 - Numerical Methods and Computations .................. 2
EG 422 - Introduction to Heat and Mass Transfer ............... 4
EG 446 - Design of Thermal Systems .............................. 3
EG 466 - Mechanics and Design of Machine Elements .......... 3
EG 488 - Analysis of Engineering Systems ....................... 3
EG 465 - Engineering Design ....................................... 3
EG 547 - Energy Conversion and Power Generation I .......... 3
EG 454 - Fluid Mechanics II ....................................... 3
* Technical Electives .............................................. 7

Total 133

* Choose from EG 220, 307, 381, 390, 487 or 505, 547, 544, 550, 554, 596, or other upper-level courses approved by the Department of Mechanical Engineering.

 Semester Hours

Total hours 129
Suggested Schedule of Courses for Full-time Mechanical Engineering Students

<table>
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<tr>
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<td>MA 251</td>
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<td>EH 102</td>
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<td>3 EG 271</td>
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<td>3 EG 294 &amp; 295</td>
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<td>EG 341</td>
<td>3 EG 300</td>
<td>3 EG 311 &amp; 301</td>
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<td>EG 362</td>
<td>3 EG 342</td>
<td>3 EG 352 &amp; 353</td>
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<tr>
<td>EG 370 &amp; 379</td>
<td>4 EG 378</td>
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<td>Total hours</td>
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</tr>
</tbody>
</table>

*Hu/SS: 9 hours in humanities/social sciences

Graduate Engineering Programs

The School of Engineering offers programs leading to the degrees of Master of Science in Engineering, Master of Science in Operations Research, and Doctor of Philosophy. Specializations for the M.S.E. and Ph.D. are in the following areas:

Electromagnetic Fields
Network Theory
Communications and Information Theory
Digital and Analog Computer Engineering
Control Sciences
Human Engineering
Engineering Management

Operations Research
Thermodynamics, Heat and Mass Transfer
Energy/Power
Systems Engineering
Environmental Engineering
Applied Mechanics
Solar Terrestrial Environment System
Solid State Electronics

Admission

In addition to both unconditional and probationary admission requirements in the Graduate School section of this catalog, the following three paragraphs are further requirements for admission for graduate study in engineering.
For unconditional admission to graduate study a student is required (1) to have earned a B average (3.0 out of a possible 4.0) in all undergraduate work attempted as well as in all engineering courses, (2) to have scored at least 1000 on the aptitude (verbal and quantitative) portion of the GRE, and (3) to have received a bachelor’s degree in an engineering curriculum that is accredited by the Accreditation Board of Engineering and Technology at the time the degree was conferred. An exception to item (3) is made for students in the MSOR Program.

Probationary admission may be granted to other students who have baccalaureate degrees and are considered after an individual examination of quantity and quality of their work to be prepared and capable of successfully pursuing graduate work toward an acceptable graduate objective. To continue graduate study, students admitted provisionally are required to maintain a B average on their first 12 semester hours of graduate course work and remove any other conditions imposed at the time of initial enrollment.

Applicants for admission to graduate study in engineering must take the advanced engineering portion of GRE, results of which are considered in determining qualification to pursue graduate study successfully.

Students who are admitted to the university as irregular postgraduates but have been denied admission to Graduate School because of a deficiency in quality point average or GRE score may be considered for graduate admission if they are otherwise eligible to pursue a particular engineering discipline. To be reconsidered, they must successfully complete 12 hours of courses numbered 500 or above (as recommended by the department into which admission is sought) in engineering, mathematics, or sciences with an average of B or better.

General Requirements for the M.S.E. or M.S.O.R. Degrees

Besides requirements for master’s degrees by the School of Graduate Studies, the following general requirements for the master’s degree are specified by the School of Engineering.

1. Average grade on the courses numbered 600 and above cannot be less than B.

2. Engineering courses numbered between 500 and 599 may be taken for graduate credit with prior approval of such courses on the student’s plan of study. Graduate students will be required to do extra work of appropriate nature in 500-level courses. A minimum grade of B must be attained in each engineering course designated by a number less than 600 in the plan of study; otherwise a substitution of another approved course is necessary.

3. All courses are selected by the student with the counsel of the adviser and are subject to approval by the appropriate department chairman, the dean of the School of Engineering, and the dean of the Graduate School. Additional course work may be required to correct deficiencies in undergraduate subjects.

4. Each department may require a seminar course(s) in addition to other requirements.

Upon admission to graduate study by the dean of the Graduate School, the student will be referred to the appropriate department chairman. A supervisory committee, which usually is but does not have to be the same as the final examining committee, should be appointed after the student has completed 12 semester hours.
Special Requirements for the M.S.E. Degree

Basic Program of Study

The basic program of study, common to both Plan One and Plan Two, contains a minimum of 24 semester hours of graduate-level course work that must include (a) 12 hours of graduate courses in an engineering major including supporting engineering courses, (b) first minor of 6 hours of courses in an approved engineering area of specialization, (c) second minor of 6 hours of courses in an engineering area other than those in (a) and (b) above or in any approved graduate area from the School of Mathematical and Natural Sciences.

With prior approval, up to 12 hours of courses numbered 500-599 may be taken in fulfillment of these requirements.

Plan One—Students selecting the master's program Plan One must (a) successfully complete an approved basic program of study, (b) complete an acceptable thesis, (see statement with EG 699), and (c) pass a comprehensive final examination.

Plan Two—Students planning to complete the master's degree requirements under Plan Two must (a) be admitted to the Plan Two program, (b) successfully complete an approved extended program of study consisting of a minimum of 9 semester hours of courses numbered 500 or above, and submit an acceptable paper on independent work, and (d) pass a comprehensive final examination.

Detailed instructions governing Plan One and Plan Two should be obtained from the chairman of the primary engineering department before beginning basic program of study.

Plan II in the Electrical and Computer Engineering Department allows the replacement of the paper on independent work by an approved project or a 600-level ECE course.

Special Requirements for M.S.E. Degree in Industrial and Systems Engineering

The Industrial and Systems Engineering Department offer the M.S.E. degree in the following options: engineering management, human engineering, systems engineering, manufacturing systems engineering and operations research.

The engineering management option has been developed to meet the needs of practicing engineers who find themselves performing engineering management functions without the benefit of formal management education. The program is designed to build upon the mathematical and analytical expertise gained from both a formal engineering education and professional experience. The program requires a minimum of 24 semester hours plus a thesis (Plan I) or 33 semester hours without a thesis (Plan II).

The systems engineering option is a program for those persons possessing a bachelor's degree in a traditional engineering area who have a desire to broaden their background into systems-oriented aspects of engineering. Methods of needs of identification, methods of cost-benefit analysis, the system life cycle concept, quality control, logistics planning and control, forecasting, etc., will provide the student with the analysis and design tools to supplement those learned in his baccalaureate engineering degree program. The program requires a minimum of 24 semester hours plus a thesis.
Special Requirements for the M.S.O.R. Degree

The Master of Science in Operations Research (M.S.O.R.) is a degree program designed primarily for graduate students with an interest in operations research. Operations Research is characterized by the solution of real world problems through application of diverse methods, techniques, tools, and algorithms. The M.S.O.R. program is concerned with optimization, stochastic systems analysis, and operations research applications. Areas of application include large-scale systems analysis, analysis of urban and socioeconomic systems, and management sciences. This program is open to students not holding an engineering undergraduate degree.

The requirements for admission to this program conform to policies of the School of Graduate Studies. In addition, the following prerequisites are required: (1) a minimum score of 500 on the quantitative portion of the general GRE, (2) mathematics through the calculus (MA 251), and (3) 6 hours of either applied or mathematical statistics.

The program of study contains a minimum of 24 semester hours of graduate-level course work that includes, (a) 12 semester hours of graduate-credit courses in operations research, including EG 626, 636, 629, (b) 6 hours of courses in approved minor area, (c) 6 hours in another minor, i.e., statistics, mathematics, etc. and (d) an acceptable thesis. Detailed instruction governing the M.S.O.R. program should be obtained from the chairman of the Industrial and Systems Engineering Department.

Special Requirements for M.S.E. Degree in Mechanical Engineering

All M.S.E. students in the Mechanical Engineering Department are guided through one of two areas of concentration; each area has a core of three required courses. The mechanical engineering area requires EG 649, 653, and 671. The engineering mechanics area requires EG 561, 571, and 671. The remainder of the program and elective courses are to be chosen with the approval of the student’s adviser. M.S.E. students must enroll in the departmental seminar, EG 683, for one term and Ph. D. students must enroll for three terms.

Requirements for the Ph.D. Degree

The degree of Doctor of Philosophy offered in the School of Engineering is granted on the basis of general scholarly proficiency, distinctive achievement in a special field, and demonstrated ability to do independent, original investigation. These attributes are tested in comprehensive examination and in a dissertation that must clearly and effectively present the substantial results of research. These accomplishments, rather than mere accumulation of residence and course credits, are essential considerations in awarding the Ph.D. degree.

In addition to minimum requirements of the School of Graduate Studies for the granting of all graduate degrees, some special minimum requirements must be met by doctoral students in engineering. These follow.

Admission to the Ph.D. Degree Program

A Ph.D. candidate must be admitted to the School of Graduate Studies before being admitted to the Ph.D. program. Admission is limited to those whose backgrounds show distinct promise of success in the program.
Examinations

A student must pass three examinations before being awarded the degree. They are:

1. The preliminary examination (or entrance examination) is a written test of the student’s capability to pursue successfully the Ph.D. and aids in developing a program of study appropriate for the student. The examination may be taken at any time after the accumulation of at least 24 semester hours of graduate work beyond the baccalaureate degree and administered by the student’s department. Upon the recommendation of the department, a student who fails this examination may repeat it after a time lapse of three months. The examination may not be taken more than twice.

2. The qualifying examination (or comprehensive examination) is a written or oral test of the student’s knowledge in the major and minor fields of study and is administered by the applying student’s advisory committee. An applicant must pass this examination to be admitted to candidacy for the Ph.D. degree. The following conditions must be satisfied before taking the examination, (1) foreign language requirements, (2) basic program of study, (3) at least 18 hours of course work in residence at UAH subsequent to passing the preliminary examination, and (4) considered by advisory committee to be adequately prepared in his major and minor fields.

3. The final examination (or dissertation examination) primarily concerns research work embodied in the candidate’s dissertation and will be taken after the dissertation has been approved by the advisory committee.

Major and Minor Subjects

A defined major subject or field of specialization is required of all candidates for the Ph.D. degree. The candidate must also have at least two minor subjects chosen with approval of the candidate’s advisory committee. One of the minors must be in mathematics.

All students must complete at least 60 semester hours of graduate course work. A minimum of 18 semester hours of course work must be within a defined major and a total of at least 33 semester hours for work within related departments including credits for the major. A minimum of 15 semester hours of work is required for the first minor and a minimum of 12 semester hours for the second.

Program of Study

The student should prepare as early as possible after the successful completion of the preliminary examination an outline of the program of study. The general requirements for the master’s degree as stated under (1) and (2) must be satisfied. This outline must be approved by the student’s advisory committee and the dean of the Graduate School. The Mechanical Engineering Department requires a minimum of three terms of seminar, EG 683, in addition to other requirements.

Transfer of Credits

Credits from other recognized institutions may be applied to the student’s program of study if so approved by the student’s advisory committee and by the Graduate School. These credits will generally not be evaluated until the student has been in residence study at UAH for at least one term and has passed the preliminary examination.
Advisory Committees
A faculty adviser appointed by the chairman of the department directs student’s work until the preliminary examination is successfully completed. Thereafter the student immediately chooses an advisory committee, subject to acceptance of the faculty members chosen and approval of the School of Engineering and the Graduate School. This committee consists of at least five members of the graduate faculty—three representing the major field of study and one from each of the minor fields. The committee chairman must be a permanent faculty member.

Admission to Candidacy for the Degree
A student should apply for admission to candidacy for the Ph.D. degree after passing the qualifying examination and obtaining approval of the dissertation subject from his advisory committee. The student must be admitted to candidacy at least six months before the degree is awarded.

Residence Requirements
The minimum period in which the doctoral degree can be earned is three full academic years in graduate study or their equivalent. The student must complete a minimum of 24 semester hours of graduate work in three consecutive terms during the second or third year or both of graduate study in the School of Graduate Studies at UAH. Half-time graduate assistants are required to complete a minimum of 18 hours of graduate work in three consecutive terms.

Language Requirement
The student must satisfy the language requirement before applying for permission to take the qualifying examination in one of the ways specified by the School of Graduate Studies.

Dissertation Registration
Students must register for a minimum of 18 semester hours of dissertation during the time they are actively conducting research and consulting their dissertation adviser.

Engineering (EG)

172 Surveying I
2 hrs.
Use of tape, level and transit with applications to planimetric and topographic mapping, traverse and area computations, stadia and construction surveys. Laboratory work included. Lab fee: Level 3. Prerequisite: EG 198 or consent of instructor.

173 Surveying II
2 hrs.

197 Computer Methods in Engineering
3 hrs.
Solution of engineering problems using a digital computer. Hardware structure of the stored-program computer; machine language programming; engineering approximation of dynamic systems; flowcharting and algorithms. Practice in solving engineering problems on the university computer using FORTRAN. Lab fee: Level 4. Prerequisite: MA 121.
198 Engineering Graphics 2 hrs.

199 Computer Graphics 1 hr.
Principles of Computer Graphics; basic techniques, transforms in two and three dimensional space, perspective, hidden line removal. Includes hands-on experience with a color graphics system. Lab fee: Level 3. Prerequisites: a course in FORTRAN or BASIC and MA 153.

202 Introduction to Digital Logic Design 3 hrs.
Engineering approaches to design and analysis of digital logic circuits. Boolean algebra, Karnaugh maps, design using MSI and LSI components, algorithmic state and machine design of sequential circuits. Prerequisite: EG 197.

220 Production and Operation Systems I 3 hrs.
Quantitative methods used in planning, analysis, design, and control of production systems. Lab fee: Level 2. Prerequisites: MA 154, EG 197.

244 Stoichiometry 3 hrs.
Introduction to basic calculations of chemical engineering, emphasizing material and energy balances on physical and chemical processes. Prerequisites: PH 112, CH 123, EG 197.

271 Statics 3 hrs.
Forces and couples and resultants of force systems, freebody-diagrams, equilibrium, problems involving friction, centroids, and moments of inertia. Prerequisite or parallel: MA 251, PH 112.

Structure of matter, basic concepts of phase transformation, mechanical, electrical, magnetic, and thermal properties, and corrosion. Basic properties of metals, plastics, elastomers, and ceramics with emphasis on methods of changing properties. Prerequisite: CH 121, PH 112 must parallel EG 295.

295 Nature and Properties of Materials Laboratory 1 hr.
Experiments related to the understanding, measurement, and modification of material characteristics. Typical experiments include microstructure analysis, hardness testing, mechanical-properties testing, equilibrium-phase diagrams, corrosion, creep behavior, and semiconductor analysis. Must parallel EG 294. Lab fee: Level 4.

300 Electrical Circuits I 3 hrs.
Electric and magnetic circuit concepts; transient and steady-state solution of simple circuits. Phasor analysis of ac circuits and network theorems. Prerequisite: PH 112. Prerequisite or parallel: MA 352.

301 Electronic Instrumentation Laboratory 1 hr.
Experiments related to elementary electronic instrumentation, solid state semiconductor devices, amplifying circuits, and experiments using analog computer. Must parallel EG 311. Lab fee: Level 3.

303 Electrical Engineering Laboratory 1 hr.
Experiments related to electrical circuits and to apply and verify principles presented in EG 313. Lab fee: Level 3. Prerequisite or parallel: EG 313 and EG 301.

305 Electronics Laboratory I 1 hr.
Experiments and reports related to amplifiers using bipolar JFET, MOSFET devices. Original design of individual circuits. Lab fee: Level 3. Prerequisite: EG 301 and must parallel EG 315.
307 **Electricity and Magnetism** 3 hrs.
Basic concepts of electrostatics, electric potential theory, electric fields and currents, fields of moving charge including relativistic treatment, magnetic fields, Maxwell’s equations. Prerequisite: MA 244, PH 112.

310 **Solid State Fundamentals** 2 hrs.
Basic physical processes occurring in solids. Crystal structure of solids, Schrödinger equation and its applications, free electron model of metals, band theory of solids, and physics of semiconductor devices. Prerequisite: PH 113, EG 294, and MA 352 or parallel.

311 **Electronic Instrumentation** 3 hrs.
Ammeters, voltmeters, and bridges. Transducers, diode and transistor models, operational amplifiers, simple digital and analog instrumentation, introduction to analog computers. Prerequisites: EG 300 and must parallel EG 301.

313 **Electrical Circuits II** 3 hrs.
Steady-state response to sinusoidal driving functions, polyphase circuits, transfer functions, resonance, magnetically coupled circuits; basic concepts of network topology and analysis, matrix formulation of network equations: algorithms. Prerequisite: EG 381.

315 **Electronics I** 3 hrs.
Analysis of large and small signal electronic devices; piece-wise linear models of bipolar and FET devices; amplifiers and their frequency response, power supplies, and special circuit applications. Prerequisites: EG 311, 313 prerequisite or parallel, and must parallel EG 305.

320 **Production and Operation Systems II** 3 hrs.
Continuation of EG 220 with additional quantitative methods for analysis, designing, and control of productive systems. Lab fee: Level 2. Prerequisites: EG 220, EG 390.

321 **Engineering Economy** 3 hrs.
Economic evaluation of engineering alternatives. Interest, depreciation, time-value of investments, learning curves, income tax break-even and minimum-cost analysis, and replacement analysis. Prerequisite: EC 142, MA 154. Not open to Freshmen.

341 **Thermodynamics I** 3 hrs.
Basic laws of energy that apply in all branches of engineering and science. Properties of matter, state variables, reversible processes, first and second laws of thermodynamics with applications to closed and open systems. Availability of energy and irreversibility. Prerequisites: MA 251, EG 294 (or parallel).

342 **Thermodynamics II** 3 hrs.
Continuation of EG 341. Thermodynamic cycles, thermodynamic relations among properties, chemical reactions, and phase and chemical equilibrium. Prerequisite: EG 341.

344 **Chemical Engineering Thermodynamics** 3 hrs.
Thermodynamics of phase equilibria, chemical reactions and thermodynamic analysis of chemical processes, with emphasis on topics of special interest to chemical engineers. Prerequisites: EG 244, 341.

352 **Fluid Mechanics I** 2 hrs.
Properties of fluids and fundamental principles governing fluid motion, including fluid statics, conservation of mass, momentum and energy with applications to pipe and channel flows of incompressible fluids. Prerequisites: EG 341, 362, MA 352.

353 **Fluid Mechanics Lab** 1 hr.
To provide the basic introduction to fluid mechanics for ME, CE, and ChE majors. Lab fee: Level 3. Prerequisite: must parallel EG 352.
359 Fluid-Thermal Laboratory
1 hr.
Laboratory in fluid mechanics, thermodynamics, and related areas. Typical experiments: flows in pipes and channels, flow control devices, verification of gas laws, compressible flow and engine performance and emission control. Lab fee: Level 3. Prerequisites: EG 341, 352.

362 Dynamics
3 hrs.
Kinematics and kinetics of particle and system of particles with applications to central force motion, impact, relative motion, vibrations, and variable mass system. Dynamics of rigid body in plane motion and vector solution of motion relative rotating axes. Prerequisite: EG 271.

364 Kinematics and Dynamics of Machines
4 hrs.
Kinematics and dynamics of planar machinery. Principles of mechanisms, design of cams, fundamentals of gears and epicyclic gear trains, methods of determination of velocity and acceleration in mechanisms. Inertia forces in machines, balancing of rotating masses and reciprocating masses, and vibration analysis. Lab fee: Level 3. Prerequisite: EG 362.

370 Mechanics of Materials
3 hrs.
Theory of stress and strain; combined stresses. Analysis of stresses and deformations in bodies loaded by axial, torsional, and bending loads; statically indeterminate members. Prerequisites: EG 271, 294.

371 Structural Analysis I
3 hrs.

372 Soil Mechanics and Foundations
3 hrs.
Index properties and characteristics of soils. Compaction shear, compressibility and permeability. Application to analysis and design of foundation elements. Laboratory included. Lab fee: Level 3. Prerequisites: EG 352, 370.

373 Reinforced Concrete Design
3 hrs.
Design of reinforced concrete structures with emphasis on the ultimate strength method. Aspects of prestresses concrete design; computer applications. Prerequisite: EG 371.

374 Elements of Structural Design
3 hrs.
Principles of design of metallic and nonmetallic structures. Analysis and design of structural elements including beams, columns, connection details, and footings.

375 Hydraulics
3 hrs.
Conservation principles of mass, momentum, and energy and their applications to hydraulic problems. Open channel flows, pipe flows and their application to water supplies in sanitary engineering, flow measurements. Prerequisite: EG 352.

376 Hydraulics Lab
1 hr.
Experiments on water table, open channels, Venturi meter, Pelton and Francis turbines, data analysis, head loss in pipe flow, and pitot static tubes. Lab fee: Level 3. Prerequisite: EG 375.

378 Materials and Manufacturing Processes
3 hrs.

379 Mechanics of Materials Lab
1 hr.
Determination of selected properties of several engineering materials including iron-

381 Operational Methods in Engineering
2 hrs.
Fourier Series, Fourier and Laplace transforms with emphasis on their physical interpretation. System representation by transfer functions and impulse response functions. Convolution integral. Prerequisite: EG 300.

390 Probability and Engineering Statistics I
3 hrs.
Engineering uses of probability theory, discrete and continuous probability distributions including the binomial, Poisson, hypergeometric, Gaussian, uniform, gamma, beta, log-normal, exponential, and extreme value distributions. Applications of statistical sampling, estimation, and hypothesis testing of means, variances, and proportions. Prerequisite or parallel: MA 251.

396 Numerical Methods and Computations
2 hrs.

398 Selected Topics in Engineering
Credit to be arranged
Prerequisite: permission of instructor.

402 Design of Digital Computer
3 hrs.
Functional organization of stored-program digital computers including number representation, computer hardware, micro-operations, and control logic; microprocessor architecture. Prerequisites: EG 202, 315.

404 Electrical Networks Laboratory
1 hr.
Experiments that apply and verify principles presented in EG 381 and 414. Lab fee: Level 3. Prerequisite or parallel: EG 414.

406 Electronics Laboratory II
1 hr.
Experiments and reports related to electronic devices such as oscillators, multi-stage amplifiers, modulation and switching circuits. Integrated circuits and microelectronics methods. Lab fee: Level 3. Prerequisite: EG 305 and must parallel EG 416.

407 Electromagnetic Waves
3 hrs.
Transient waves, steady-state waves on transmission lines, Smith chart, line matching, plane waves, and waveguides. Laboratory experiments included. Lab fee: Level 2. Prerequisites: EG 307 (PH 331).

411 Electric Power System
3 hrs.
Power generation, transmission, and distribution. Three-phase circuits and per unit analysis, load-flow studies, symmetrical components, and power systems stability. Prerequisite: EG 313.

414 Passive Electrical Networks
3 hrs.
Driving point and transfer functions, frequency response of network, filter theory, and approximation for idealized network characteristics. Prerequisite: EG 313.

416 Electronics II
3 hrs.
Integrated circuits and microdevices related to multistage amplifiers, oscillators, design specifications, operational amplifiers, and microcircuits. Prerequisites: EG 310, 313, and 315.

419 Senior Design Project in Electrical and Computer Engineering
Credit to be arranged
Continuation of EG 493 leading to design of an engineering system. Lab fee: Level 2. Prerequisites: EG 493, senior standing, and permission of instructor.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
<th>Prerequisites</th>
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</thead>
<tbody>
<tr>
<td>421</td>
<td>Probability and Engineering Statistics II</td>
<td>3 hrs.</td>
<td>Continuation of EG 390 with regression analysis, analysis of variance, and non-parametric statistics. Design of engineering experiments, quality control, and computer solution of large-scale problems. Prerequisite: EG 390.</td>
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<td>427</td>
<td>Management Systems Analysis</td>
<td>3 hrs.</td>
<td>Formal organization structures and functions. Analysis of informal organization function within formal organization. Techniques for making decisions within formal organizations, together with ethical constraints. Prerequisite: EG 220, 390.</td>
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<td>429</td>
<td>Systems Analysis and Design II</td>
<td>2 hrs.</td>
<td>Continuation of design project begun in EG 428. Prerequisite: EG 428.</td>
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<td>430</td>
<td>Metal Processing and Metrology</td>
<td>3 hrs.</td>
<td>Theory and practice of metal removal, including cutting mechanics, interactions of cutting tools and materials; thermal considerations and probabilistic nature of tool life; effect of tool design on process behavior and optimization. Includes laboratory. Lab fee: Level 3. Prerequisite: EG 370 and senior standing.</td>
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<tr>
<td>439</td>
<td>Selected Topics in Industrial and Systems Engineering</td>
<td>Credit to be arranged</td>
<td>Philosophy and methods of industrial and nonindustrial systems analysis and design. Methods of systems definition, analysis, simplification, evaluation, and optimization. Design project required. Prerequisite: EG 421 and senior standing.</td>
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<tr>
<td>440</td>
<td>Unit Operations Laboratory</td>
<td>3 hrs.</td>
<td>Experimental studies covering topics from reaction kinetics, fluid flow, heat transfer, and chemical thermodynamics with emphasis placed on written and oral laboratory report presentation techniques. Lab fee: Level 4. Prerequisite: EG 344 or senior standing.</td>
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<td>442</td>
<td>Introduction to Heat and Mass Transfer</td>
<td>4 hrs.</td>
<td>Principles of heat and mass transfer; application of principles to problems in conductive, convective, and radiative-heat transfer and mass transfer; laminar and turbulent flow processes. One credit hour laboratory included. Lab fee: Level 4. Prerequisites: EG 341, 352, 396, MA 352.</td>
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<td>443</td>
<td>Mass Transfer Operations</td>
<td>3 hrs.</td>
<td>Theory of mass transfer phenomena, with applications to both stagewise and diffusion-controlled distillation, gas absorption/desorption, humidification and extraction processes. Prerequisites: EG 344; 442.</td>
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<tr>
<td>446</td>
<td>Design of Thermal Systems</td>
<td>3 hrs.</td>
<td>Principles of heat transfer, thermodynamics, and fluid mechanics applied to analysis and design of systems for storage and transport of energy. Modeling of thermal equipment, simulation of system performance, optimization of system design, and comprehensive design of thermal systems. Lab fee: Level 3. Prerequisite: EG 342, 442, 493.</td>
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<tr>
<td>447</td>
<td>Chemical Engineering Design I</td>
<td>3 hrs.</td>
<td>Component design of individual chemical engineering equipment to include solid/liquid handling, contacting devices and distribution systems. Introductory topics in computer-aided design will be discussed. Lab fee: Level 1. Prerequisites: EG 443, 493, 487.</td>
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<tr>
<td>448</td>
<td>Chemical Engineering Design II</td>
<td>3 hrs.</td>
<td>An overall team design effort, using modern computer-aided design techniques, to perform a preliminary design, simulation and economic evaluation of a chemical production flow sheet. Lab fee: Level 3. Prerequisites: EG 447, 541.</td>
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<td>Course Code</td>
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<td>454</td>
<td>Fluid Mechanics II</td>
<td>3 hrs.</td>
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<td>Continuation of EG 352 - differential form of basic equations, dimensional analysis, boundary layers, one-dimensional compressible flow, potential flow, turbomachinery. Prerequisites: EG 352, 353.</td>
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<tr>
<td>459</td>
<td>Selected Topics in Engineering</td>
<td>Credit to be arranged</td>
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<td>465</td>
<td>Engineering Design</td>
<td>3 hrs.</td>
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<td></td>
<td>Continuation of EG 493 leading to design of an engineering system. Lab fee: Level 2. Prerequisites: EG 493, senior standing, and permission of instructor.</td>
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<td>466</td>
<td>Mechanics and Design of Machine Elements</td>
<td>3 hrs.</td>
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<td>Detailed design and selection of machine elements such as gears, shafts, and bearings. Analysis of stresses and deformations under combined static and dynamic loads, stress concentrations, and fatigue. Prerequisites: EG 364, 370.</td>
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<td>471</td>
<td>Structural Analysis II</td>
<td>3 hrs.</td>
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<td>472</td>
<td>Hydraulic Engineering</td>
<td>3 hrs.</td>
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<td>Water-hammer analysis; hydraulic structures such as dams, spillways, stilling basins, flood control devices, locks, pipe-flow systems and water-supply facilities. Prerequisite: EG 375.</td>
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<td>473</td>
<td>Transportation Engineering and Design</td>
<td>3 hrs.</td>
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<td>Theory, design, and operation of various modes of transportation. Prerequisites: EG 173, 372.</td>
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<td>475</td>
<td>Hydrology</td>
<td>2 hrs.</td>
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<td>Hydrologic cycles, rainfall and runoff analysis, hydrograph analysis, water-shed studies, overland flow and flood routing, sediment transport, hydrologic forecast. Prerequisite: EG 352.</td>
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<td>476</td>
<td>Sanitary Engineering</td>
<td>3 hrs.</td>
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<td>Principles of public water-supply design. Source selection, collection, purification, and distribution for municipal use. Collection of waste waters, their treatment, and disposal. Prerequisites: EG 372, 375, 475.</td>
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<td>477</td>
<td>Civil Engineering Project I</td>
<td>1 hr.</td>
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<td>Individualized design project under supervision of instructor. Prerequisite: senior standing.</td>
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<td>478</td>
<td>Civil Engineering Project II</td>
<td>3 hrs.</td>
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<td></td>
<td>Analysis and design of complete civil engineering project including establishment of design criteria, cost estimates, specifications, and plans. Prerequisite: EG 477.</td>
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<td>487</td>
<td>Analysis and Control of Dynamical Processes</td>
<td>2 hrs.</td>
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<td>Dynamical processes found in major engineering disciplines, economics, biology, sociology, and psychology. Analysis of existing systems and problems of synthesizing closed-loop feedback controllers to achieve improved performance and stability. Prerequisites: MA 251 and senior standing.</td>
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<td>488</td>
<td>Analysis of Engineering Systems</td>
<td>3 hrs.</td>
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<td>Mathematical modeling of physical systems and determining their dynamic response. Mechanical, electrical, electromechanical, heat transfer, fluid-mechanical, and other engineering problems. Prerequisite: senior standing.</td>
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<td>493</td>
<td>Introduction to Engineering Design</td>
<td>2 hrs.</td>
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<td>Application of basic design principles and concepts. Design methodology, decision making, creativity, product liability, human factors, patents, and others. Team design projects. Prerequisite: EG 321, senior standing in engineering.</td>
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</tbody>
</table>
496 Selected Topics in Engineering

501 Electric Machines
Direct and alternating current machines equivalent circuits and models, efficiency, input requirements and output characteristics, applications; graphical and mathematical aspects of electrical machines. Prerequisite: EG 313.

502 Advanced Logic Circuits
Boolean algebra; the n-cube, star array, Karnaugh arrays; one-to-one transformations, partial transformations, DON'T-CARES; symmetric switching function synthesis and reduction with applications to multiple input adders; generator theory of flip-flops and stability condition; serial arithmetic and the binary comparator. Prerequisite: EG 202.

503 Analog and Hybrid Simulation
Principles of analog, digital, and hybrid computation. Analog components for addition, multiplication, integration, and function generation. Analog computer simulation of systems represented by linear and nonlinear differential equation. Analog-digital (Hybrid) simulation techniques. Laboratory sessions. Lab fee: Level 3. Prerequisites: EG 311 and 381 or MA 352.

504 Instrumentation
Measurement techniques and conventional and electronic instruments. Construction, theory of operation, and proper use of bridge circuits, oscilloscopes transducers, and digital instruments. Prerequisite: EG 315.

505 Automatic Control Theory
Theory common to all feedback control systems. Transfer functions, stability criteria, and frequency response. Prerequisite: EG 381.

506 Communication Theory
Transmission of information including effects of networks, modulation systems, noise, and use of statistics in analysis of information transmission. Prerequisite: EG 381.

509 Microcomputers
The microcomputer as a component in digital design. Laboratory experience in interfacing and design projects. Lab fee: Level 3. Prerequisites: EG 202 and 315; EG 516 recommended.

510 Selected Topics in Electrical Engineering

516 Digital Electronics

519 Digital Electronics Laboratory
Experiments and reports related to logic circuit realization of digital hardware. RTL, DI, TT, ECI families for combinational and sequential switching circuits. Lab fee: Level 4. Must parallel EG 516.

522 Logistics Planning and Control
Basic nature of logistics systems. Quantitative analysis of two networks and their interaction, the logical network for project-planning and control, and the physical distribution network. Charting, milestone method, lines of balance PERT-CPM, resource allocation and leveling, and maximum flow and minimum cost algorithms. Lab fee: Level 2. Prerequisite: EG 390.

523 Statistical Quality Control
Statistical theory and techniques to control quality of manufactured products. Prerequisite: EG 390.
524 Introduction to Ergonomics: Work Development
3 hrs.
Philosophy, methodology, and techniques related to providing optimal match between job requirements and worker skills. Intensive use of actual industrial requirements and experience in practical applications. Lab fee: Level 3. Prerequisites: EG 390; EG 320 or graduate standing.

526 Design and Analysis of Experiments
3 hrs.
Advanced topics in statistical experiments with emphasis on design aspect. Confounding, fractional replication, factorial and nested designs. Prerequisite: EG 421.

527 Systems Simulation
3 hrs.
Methods and procedures for simulation of complex systems. Both discrete increment and continuous time models. Lab fee: Level 5. Prerequisites: EG 197; EG 390, 621 or MA 585.

530 Modern Manufacturing/Production Systems
3 hrs.
Overview of modern manufacturing and production systems, including principles, theory and practical applications of integrated manufacturing systems with and without robotics and automated materials handling. Includes review of classical systems, Japanese production systems, and group technology. Lab fee: Level 2. Prerequisite: EG 430.

539 Selected Topics in Industrial Engineering

540 Physical Properties of Fluids
3 hrs.
Theoretical, experimental, and correlation methods for determining and predicting the thermodynamic and transport properties of various fluids. Critical properties, equations of state, vapor pressure and latent heat, heat capacity, viscosity, thermal conductivity, diffusion coefficient, phase equilibrium, heat and free energy for formation. Prerequisite: EG 342. Offered upon demand.

541 Chemical Kinetics and Reactor Design
3 hrs.
Fundamental principles of chemical kinetics and chemical reactor engineering along with the design of both thermal and catalytic reactors. Prerequisites: EG 344, 443.

542 Internal Combustion Engines
3 hrs.
Application of principles of thermodynamics, heat transfer, and fluid mechanics to combustion engines and turbines. Basic engine types, engine components, idealized cycles, combustion, fuels, engine variables, testing, exhaust gas analysis, and air pollution as related to spark-ignition, compression-ignition, and turbine engines. Prerequisites: EG 342, 442, 454.

544 Analysis and Design of HVAC Systems
3 hrs.
Analysis and design of heating, ventilation, and air-conditioning (HVAC) systems. Design requirements for human comfort, exterior weather conditions, and energy conservation. Calculation of heating and cooling loads for residential and commercial buildings, air and liquid distribution systems, selection and specification of system components, energy recovery and system efficiency, and commercially available systems. Prerequisites: EG 342, 442.

545 Heat Distribution System Design
3 hrs.
Design of hydronic and air distribution systems used in heating and air conditioning. Piping design, pump selection, heat coils, room air distribution, ducting design, fan selection, controls, and complete systems. Prerequisites: EG 454, 544; EG 446 recommended.

546 Solar Energy Systems
3 hrs.
Components for solar-energy systems (collectors, heat exchangers, thermal storage). Numerical simulation of solar energy systems, and solar energy system design. Residential and commercial space heating, process heating, and hybrid system applications. Prerequisites: EG 446, 544, EG 454 recommended.
547 Energy Conversion and Power Generation I 3 hrs.
Application of principles of thermodynamics and fluid mechanics and economics to analysis and design of conventional hydro and steam power plants. Energy sources and end uses, fossil fuels, combustion equipment, steam generators, and pollution control devices. Hydro, steam, and wind turbines. Prerequisites: EG 352, 442, 454, EG 446 recommended.

548 Energy Conversion and Power Generation II 3 hrs.
Application of principles of thermodynamics, heat transfer, and fluid mechanics to combustion engines and turbines. Basic engine types, engine components, idealized cycles, combustion, fuels, engine variables, testing, exhaust gas analysis, and air pollution as related to spark-ignition, compression-ignition, and turbine engines. Prerequisites: EG 342, 442, 454.

549 Introduction to Environmental Engineering 3 hrs.
Engineering aspects of air, water, and thermal pollution. Hydrologic cycle, water sources and uses; industrial and other sources of primary and secondary pollutants. Transport processes in environmental problems and in their control. Prerequisite: EG 442.

550 Environmental Control 3 hrs.
Engineering design and synthesis of environmental control systems. Control of multiphase systems with application to air and water pollution control. Prerequisite: EG 442.

554 Advanced Fluid Mechanics 3 hrs.
Derivation of equations of motion, stress and rate of strain tensors; survey of application in one, two, or three dimensions; the complex potential and singularities, airfoils, and aerodynamic shapes; exact solutions of Navier-Stokes equations, approximations for flow at low and high Reynolds numbers; turbulence. Prerequisite: EG 454.

558 Dimensional Analysis and Similitude 3 hrs.
Nature and use of dimensions, principles of dimensional analysis, systematic calculation of dimensionless products, algebraic theory of dimensional analysis, similarity and model testing. Applications to problems of stress and strain, dynamics, fluid mechanics. Theory of heat and electrical phenomena, differential equations and similarity. Prerequisite: EG 352. Offered upon demand only.

559 Selected Topics in Mechanical Engineering Credit to be arranged

561 Vibrations of Elastic Systems 3 hrs.
Formulation of the equations of motion of discrete and continuous systems, analytical and numerical methods of solution, eigenvalue problems, and dynamic response. Prerequisite: EG 488.

563 Intermediate Dynamics 3 hrs.
Kinematics and dynamics of particles, system of particles, and rigid-body. Variational principles and Lagrangian mechanics. Prerequisite: EG 362.

570 Mechanical Behavior of Engineering Materials 3 hrs.
Structure, properties, and behavior of materials. Structural defects and their influence on mechanical properties, point defects, dislocation and lattice imperfection in crystals, plastic deformation of single crystal and polycrystalline alloys, strengthening mechanisms and fracture. Strain rate, time to failure, and cyclic life from a microscope viewpoint. Prerequisites: EG 294, 370.

571 Applied Mechanics of Solids 3 hrs.
Stresses and strains at a point, theories of failures, stress concentration factors, thick-walled cylinders, torsion of noncircular members, curved beams, unsymmetrical bending, and shear center. Prerequisite: EG 370.
572 Matrix Methods in Structural Mechanics
Matrix application to formulation and solution of linear problems in structural mechanics. Stresses, vibrations, and stability of engineering structures. Prerequisite: EG 471.

579 Selected Topics in Civil Engineering
Credit to be arranged

596 Numerical Engineering Analysis
Finite elements and finite differences in solving various engineering problems. Numerical applications to fluid mechanics, heat transfer, structural mechanics, and machine design. Prerequisite: EG 396.

600 Bit-Slice Design
Theoretical and practical aspects of computer hardware design using AMD 2900 family bit-slice components and similar components. Lab fee: Level 3. Prerequisite: EG 509.

601 Linear Systems
Formulation and solution by transform methods of differential equations of linear electrical and electromechanical systems, state equations, signal-flow graphs, and discrete-time systems. Prerequisite: graduate standing.

602 Digital Computer Design

603 Computer Methods in Power Systems
System modeling and matrix analysis of three-phase power networks. Application of numerical methods and computers to solution of problems related to planning, design, and operation of electric-power systems. Prerequisites: EG 411 and 501.

604 Digital Image Processing

605 Control System Design
Control system synthesis by means of feedback, feedforward, minor loop, and cascade techniques. System designs by analog simulation. Laboratory sessions. Lab fee: Level 3. Prerequisite: EG 505.

606 Statistical Communications Theory

608 Electromagnetic Field Theory I

609 Electromagnetic Field Theory II
Continuation of EG 608. Prerequisite: EG 608.

610 Selected Topics in Electrical Engineering
Credit to be arranged
613 Laser Electronics

614 Linear Graphs and Electrical Networks

615 Active Networks Synthesis
Properties and synthesis of RC and LC networks, active network elements, RC active filter design, network sensitivity analysis, realization methods, approximation theory, and filter design. Prerequisite: EG 414.

616 Microelectronic Devices and Integrated Circuits

617 Very Large Scale Integration Devices
Discussion of MOSFET characteristics. Second-order considerations for a MOSFET, Computer modeling, VLSI device fundamentals, and scaling laws. Micron-length and submicron-length semiconductor devices. Gallium arsenide (GaAs) digital integrated circuits for ultra-high speed VLSI. Basic technology and applications of VLSI. Impact of VLSI on computer architectures. Prerequisite: EG 616.

620 Engineering Management I
Principles of executive process in technical organizations. Basic management functions, scientific management, planning, directing, controlling, and decision making as they relate to management of technical organizations and design and implementation of management systems. Prerequisite: graduate standing.

621 Statistical Methods of Engineers
Application of probability and statistics useful in research work. Descriptive statistics, theoretical distribution functions, point and interval estimation, test of hypotheses, linear regression, and analysis of variance. Prerequisites: MA 251 and graduate standing.

622 Research and Development Management
Problems unique to the management of organizations engaged in R&D activities. Management control systems for R&D projects, motivation of technical personnel, problems of managing the creative person, means of increasing creativity, and management of change. Prerequisite: EG 620.

623 Engineering Economic Analysis
Mathematical models for expenditure analysis under uncertainty. Relationship between investment decision criteria and microeconomic theory. Capital planning and budgeting. Decisions involving expansion, acquisitions, replacement, and disinvestment. Prerequisite: EG 421 or EG 621.

624 Advanced Ergonomics: Man-Machine Interfaces
Psychological, physiological, and anthropometric requirements of human beings and their relationship to design specifications for machine in man-machine interfaces. Lab fee: Level 2. Prerequisite: EG 524.
626 Introduction to Operations Research 3 hrs.  
Philosophy and methodology of operations research. Lab fee: Level 3. Prerequisite: EG 197 or CS 113, EG 390 or 621, MA 251.

627 Introduction to Systems Engineering 3 hrs.  
Overview of engineering analytic methods applied to design of operational, procedural, and hardware systems. Concepts of the system life cycle, and the cost-benefit and tradeoff analyses. Use of engineering models of components, logic, signals, and organization in systems analysis. Prerequisite: EG 390 or 505 or 506 or 621.

628 Engineering Management II 3 hrs.  
Organization and human relations of technical management. Formal and informal organizations, job satisfaction, motivation of employees, manager-employee relations, social behavior in work situation, and executive management functions as they influence design and implementation of management systems. Prerequisite: EG 620.

Classical optimization theory with introduction to search techniques. Jacobian and Lagrangian methods, Kuhn-Tucker conditions, quadratic programming, geometric and dynamic programming, and several search procedures. Lab fee: Level 5. Prerequisites: EG 626, 390 or 621.

630 Automation: Numeric Control to Computer-Aided Manufacturing 3 hrs.  
Numerical Control, CNC, DNC, FMS, unmanned cellular manufacturing systems, robotics, automation and other aspects of programmable automation systems found in CAM. Includes introduction to adaptive control, NC and robot programming. Lab fee: Level 5. Prerequisite: EG 530.

631 Management Information Systems 3 hrs.  
Design of integrated information systems necessary for effective management. Methods of systems design, basic concepts of computer processing systems, design of management information procedures and reports, and their application to mechanized and electronic data-processing equipment. Prerequisite: EG 197 or CS 113.

632 Stochastic Systems 3 hrs.  
Processes whose outputs are governed by probabilistic laws. Gaussian processes, processes with correlated and uncorrelated variables, and Markov processes. Lab fee: Level 2. Prerequisite: EG 421 or 621.

633 Industrial Forecasting and Analysis I 3 hrs.  
Industrial forecasting methods. Simple forecasting models, multivariate regression, correlation, and spectral analysis, exponential smoothing, and Box-Jenkins forecasting. Lab fee: Level 3. Prerequisite: EG 421 or EG 621.

634 Value and Decision Theory 3 hrs.  
Mathematical development of decision-making process. Statistical decision theory and game theory applied to decision making under risk and uncertainty. Consideration of utility, benefit functions, opportunity loss and value of additional information. Prerequisite: EG 390 or 621.

635 Linear Programming 3 hrs.  
Application of linear programming to complex allocation problems. Methods for determining maximum or minimum of objective functions whose variables are subject to constraints. Simplex methods, degeneracy, modified simplex, transportation problems, network flows, goal programming, and sensitivity analysis. Lab fee: Level 4. Prerequisite: EG 626.

636 Systems Modeling 3 hrs.  
Philosophy and methodology for modeling probabilistic systems. Team project required. Lab fee: Level 4. Prerequisites: EG 390 or 621, EG 626 or 627.
<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>638</td>
<td>Engineering Reliability</td>
<td>3 hrs.</td>
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<td></td>
<td>Methodology of reliability prediction including application of discrete and continuous distribution models. Reliability estimation, reliability logic diagrams, life testing, and reliability demonstration. Prerequisite: EG 421 or 621.</td>
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<tr>
<td>639</td>
<td>Selected Topics in Industrial and Systems Engineering</td>
<td>Credit to be arranged</td>
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<tr>
<td>641</td>
<td>Advanced Thermodynamics</td>
<td>3 hrs.</td>
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<td></td>
<td>Application of classical thermodynamics. Treatment of problems involving nonideal gases and liquids, phase equilibrium, and chemical equilibrium. Prerequisite: EG 342.</td>
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<tr>
<td>645</td>
<td>Propulsion</td>
<td>3 hrs.</td>
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<td></td>
<td>Aerothermodynamics of rocket propulsion systems; rocket propellants and combustion; heat transfer and cooling problems. Application to ramjets and hybrid systems. Prerequisite: EG 545. Offered upon demand.</td>
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<td>649</td>
<td>Transport Phenomena</td>
<td>3 hrs.</td>
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<td>Mass, energy, and momentum transport in steady and transient motions in real and rheological substances. Prerequisite: EG 442.</td>
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<tr>
<td>652</td>
<td>Introduction to Air Pollution Control</td>
<td>3 hrs.</td>
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<td>Technology of air pollution dealing with air pollutants, effects, sources, combustion processes, and abatement and control technology. Engineering contributions to both the problems and their solutions. Nature of air pollution problem and fundamental technological approaches to its solution. Prerequisite: graduate standing. Offered upon demand.</td>
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<tr>
<td>653</td>
<td>Gasdynamics</td>
<td>3 hrs.</td>
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<td>Fluid mechanics and thermodynamics of ideal and real gases. Shock waves, Prandtl-Meyer fans, acoustic waves, isentropic, isothermal, and general diabatic flows. Laval nozzles, exact solutions for flow over wedges and cones, and approximate methods. Prerequisite: EG 554.</td>
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<td>654</td>
<td>High Speed Flow Theory</td>
<td>3 hrs.</td>
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<td>Transonic, supersonic, and hypersonic flows. Compressible potential flows, perturbation methods, similarity rules, characteristics, chemically reacting flows, and blunt-body problem. Prerequisite: EG 653.</td>
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<tr>
<td>655</td>
<td>Hydrodynamics</td>
<td>3 hrs.</td>
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<td></td>
<td>Potential flow in two and three dimensions, potential and stream functions, vorticity; Laplace's equation, singularities and distributions of singularities, complex potential, conformal mapping. Prerequisites: EG 554 and a course in vector calculus.</td>
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<tr>
<td>656</td>
<td>Viscous Flow and Convective Heat Transfer I</td>
<td>3 hrs.</td>
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<td></td>
<td>Navier-Stokes equations, including several exact solutions and several approximate solutions for both large and small Reynold's number in incompressible flow. Free and forced convective heating. Application to laminar and turbulent flows. Prerequisite: EG 554.</td>
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<tr>
<td>659</td>
<td>Selected Topics in Mechanical Engineering</td>
<td>Credit to be arranged</td>
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<tr>
<td>660</td>
<td>Theory of Vibrations</td>
<td>3 hrs.</td>
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<td></td>
<td>Matrix treatment of systems with many degrees of freedom. Vibrations of elastic bodies. Nonlinear vibration of systems with single degree of freedom. Prerequisite: EG 561 or 563.</td>
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<tr>
<td>661</td>
<td>Advanced Dynamics</td>
<td>3 hrs.</td>
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<td></td>
<td>Variational methods, optimization, and dynamic stability. Lagrangian and Hamiltonian formulation for dynamical systems and Hamilton-Jacobi theory. Prerequisite: EG 563.</td>
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</tbody>
</table>
Astronomy 643

Astrodynamics 3 hrs.
Astronomical coordinates and time systems; the many-body problems and disturbing functions. General perturbation theories, special perturbation methods, and application of classical mechanics and Hamilton-Jacobi methods to orbital mechanics. Prerequisite: EG 563.

671 Continuum Mechanics 3 hrs.
Kinematics and kinetics, various coordinate systems, constitutive equations for continuous media; applications to boundary value and initial value problems. Prerequisites: EG 352, 370.

672 Theory of Elasticity 3 hrs.

674 Finite Element Analysis I 3 hrs.
Finite element theory, variational methods, weighted residuals; applications to linear partial differential equations in continuous media; solution of boundary-value and initial-value problems. Prerequisite: EG 671.

676 Inelastic Behavior of Materials and Structures 3 hrs.
Theory of constitutive equations with applications in classical viscoelasticity, thermoelasticity, and plasticity. Linear viscoelasticity, creep and relaxation phenomena; linear coupled thermoelasticity. Classical theories of plasticity, kinematic hardening law, concept of stress space, limit analysis. Applications to selected boundary-value and initial-value problems. Prerequisite: EG 671.

677 Experimental Stress Analysis 3 hrs.
Experimental methods to determine stress distribution in machine and structural elements subjected to static and dynamic loadings. Theory and laboratory application of mechanical and electrical resistance strain gauges, brittle coatings, and analogies. Prerequisite: EG 571.

678 Mechanics of Composite Materials 3 hrs.
Introduction to composite materials, micro- and macromechanical behavior of laminae; bending, buckling and vibration of laminated plates. Prerequisites: EG 671, 672.

683 Graduate Seminar in Mechanical Engineering No Credit
Minimum one-term requirement for M.S.E. students in mechanical engineering and minimum three-term requirement for Ph.D. students in mechanical engineering.

692 Graduate Engineering Analysis I 3 hrs.
Linear algebra, matrices, and its applications to system of differential equations, vector analysis, integral theorems, and introduction to tensor analysis. Prerequisite: MA 352.

693 Graduate Engineering Analysis II 3 hrs.
Fourier series, Fourier integrals, Laplace transformations, partial differential equations, boundary-value problems, and special functions. Prerequisite: MA 352.

699 Master's Thesis 3 or 6 hrs.
Required each term student is working and receiving direction on his master's thesis. Minimum of two terms and 6 hours required for M.S.E. students. A maximum of 9 hours of credit is awarded upon successful completion of master's thesis.

700 Sampled Data Control Systems 3 hrs.
Classical and modern methods for analysis and design of sampled data-control systems; Z-transforms, transport lags, z and w plane analysis, state variables, and the transition matrix. Prerequisite: EG 701.
701 Advanced Linear Control Theory 3 hrs.
Modern techniques for analysis and design of linear control systems. Matrix formulation, multivariable control systems, state variable concepts. Linear transformation, controllability, observability, discrete-time systems. Prerequisite: EG 605 or permission of instructor.

702 Theory of Automata 3 hrs.
Linear automata, efficient and inefficient coders analyzed with Z-transforms and cyclotomic polynomials. State description of autonomous automata. Multilinear automata and various machines. Prerequisite: EG 602.

704 Nonlinear Control Systems 3 hrs.
Classical and modern methods for analysis and design of nonlinear automatic control systems. State variables, phase plane, limit cycles, stability, describing functions, relay control, stabilization theory. Prerequisite: EG 701.

705 Theory of Optimal Control 3 hrs.
General theory of optimal control of dynamic processes. Calculus of variations. Hamilton-Jacobi theory. Pontryagin’s maximum principle, dynamic programming. Prerequisite: EG 701 or approval of instructor.

706 Communication Systems 3 hrs.

707 Information Theory 3 hrs.
Self-information, entropy, mutual information, and channel capacity, encoding, error detecting and correcting codes. Sampling theorem. Discrete and continuous channels. Prerequisite: EG 506. Offered alternate years.

708 Digital Signal Processing 3 hrs.
Theory and applications of signal processing by digital techniques. Difference equations, Z-transform theory, digital-filter design, fast Fourier transform, quantization effects, and discrete estimation. Applications in digital filtering, signal processing, data analysis and smoothing, and image processing. Prerequisite: EG 606 or 614 or 605 or 602.

710 Selected Topics in Electrical Engineering Credit to be arranged.

711 Antenna Theory 3 hrs.
Antennas and antenna arrays. Radiation patterns and impedance characteristics. Spheres, cylinders, horns, slots, microwave lenses, traveling-wave, and frequency independent antennas. Prerequisite: EG 608.

718 Microwave Techniques 3 hrs.

719 Advanced Electromagnetic Field Theory 3 hrs.
Classical theory of electricity and magnetism. Potential theory, time-varying fields, boundary-value problems, stresses, theory of relativity. Prerequisite: EG 609.

721 Advanced Statistical Applications 3 hrs.
Continuation of EG 621 with extension to nonparametric methods, multivariate analysis and clustering techniques. Lab fee: Level 3. Prerequisite: EG 621.

729 Advanced Nonlinear Programming 3 hrs.
Continuation of EG 629 with emphasis on development and application of nonlinear
programming algorithms. SUMI algorithm, Zoutendyk's method of feasible directions, Rosen's gradient method, and selected algorithms from current literature. Lab fee: Level 5. Prerequisite: EG 629.

730 Multi-criteria Decision Analysis 3 hrs.
Methods for analysis of management-decision problems involving multiple goals and constraints. Linear and nonlinear goal programming; risk programming and decision making in fuzzy environments. Prerequisite: EG 635.

733 Industrial Forecasting and Analysis II 3 hrs.
Industrial forecasting methods. Box-Jenkins model diagnostic checking, seasonal models, and transfer function modeling. Lab fee: Level 3. Prerequisite: EG 633.

735 Discrete Optimization 3 hrs.
Integer programming and network analysis. Zero-one problem formulation and Balas method, cutting plane techniques, branch and bound, out-of-kilter algorithm, and special applications of integer programming. Lab fee: Level 4. Prerequisite: EG 635.

737 Advanced Simulation Modeling 3 hrs.
Simulation methodology utilizing GPSS, Q-GERT, and SLAM simulation languages. Design, preparation, and execution of continuous, discrete, and combined simulation models. Lab fee: Level 5. Prerequisite: EG 527.

739 Selected Topics in Industrial and Systems Engineering Credit to be arranged

741 Statistical Thermodynamics 3 hrs.

743 Direct Conversion of Energy 3 hrs.
Systems for direct conversion of heat to electricity including thermionic, magneto-hydrodynamic, fuel cells, and semiconductor devices. Prerequisite: EG 641.

747 Advanced Heat Transfer 3 hrs.

752 Mechanics of Rarefied Gases 3 hrs.
Application of kinetic theory to rarefied gas-flow problems. Boltzmann statistical distribution; gas-surface interaction, transport properties, free molecule flow; heat-free molecule flow; procedures for non-equilibrium flows. Prerequisite: EG 554. Offered upon demand.

753 Magneto-Gas Dynamics 3 hrs.
Equations of motion for ionized gases with critical analysis of transport properties in steady and varying electric and magnetic fields. MHD shock waves and radiation effects. Prerequisite: EG 653.

756 Viscous Flow and Convective Heat Transfer II 3 hrs.
Boundary layers in compressible flow; adiabatic, heated, and cooled walls; aerodynamic heating; shock-wave boundary layer interactions. Prerequisites: EG 653, 656.

757 Turbulence 3 hrs.
Turbulence in gases and liquids; boundary layers, atmospheric phenomena. Prerequisite: EG 656.

759 Selected Topics in Mechanical Engineering Credit to be arranged
<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>760</td>
<td>Analytical Methods in Nonlinear Dynamics</td>
<td>3 hrs.</td>
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<td>Theory and applications of nonlinear vibration</td>
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<td></td>
<td>phenomena, transient and steady-state response</td>
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<td>of nonlinear systems. Prerequisite: EG 661.</td>
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<tr>
<td>762</td>
<td>Wave Motion of Continuous Elastic Bodies</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Dynamics of continuous elastic bodies. Properties</td>
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<td>of wave motion considered while studying motion</td>
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<td></td>
<td>of elastic string. Propagation of elastic waves</td>
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<td></td>
<td>infinite and semi-infinite bodies, cylinders,</td>
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<td>rods, and beams. Prerequisite: EG 660.</td>
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<tr>
<td>768</td>
<td>Dynamics of Aerospace Vehicles</td>
<td>3 hrs.</td>
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<td>Advanced problems in aerospace vehicles, rigid-</td>
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<td></td>
<td>body dynamics, and stability. Trajectory</td>
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<td>optimization for space navigation and related</td>
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<td></td>
<td>topics. Prerequisite: EG 661.</td>
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<tr>
<td>772</td>
<td>Theory of Structural Stability</td>
<td>3 hrs.</td>
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<td>Energy criterion for stability of elastic</td>
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<td>structure under conservative loading. Stability</td>
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<td></td>
<td>concept for general continuous systems. Rigorous</td>
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<td>and approximate methods of analysis. Bucking of</td>
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<td>structural elements under impulsive and</td>
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<td>nonconservative loading. Postbuckling behavior.</td>
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<td></td>
<td>Prerequisite: EG 671. Offered upon demand.</td>
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<tr>
<td>773</td>
<td>Theory of Shells</td>
<td>3 hrs.</td>
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<td></td>
<td>The first-approximation theory of thin shells,</td>
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<td>higher approximations, and transverse-shear</td>
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<td>deformations; geometrical nonlinearities and</td>
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<td>shell instability. Illustration of theories by</td>
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<td>selected problems. Prerequisite: EG 671.</td>
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<tr>
<td>774</td>
<td>Finite Element Analysis II</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Advanced topics in finite element analysis;</td>
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<td></td>
<td>application to nonlinear partial differential</td>
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<td></td>
<td>equations in continuum mechanics; theoretical</td>
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<td></td>
<td>studies of convergence and stability of solutions.</td>
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<td>Prerequisite: EG 674.</td>
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<tr>
<td>778</td>
<td>Fracture Mechanics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Theory of crack propagation, stress intensity</td>
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<td>factors, mapping techniques, series expansion,</td>
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<td>asymptotic approximations, alternating method,</td>
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<td>field singularities, integral transforms,</td>
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<td>numerical solutions. Prerequisites: EG 671, 672.</td>
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<tr>
<td>799</td>
<td>Doctoral Dissertation</td>
<td>3-6 hrs.</td>
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</table>
School of Graduate Studies

Dean N. F. Audeh, B.S., M.S., Ph.D., Professor of Electrical Engineering.

The graduate programs of the University of Alabama in Huntsville provide a learning experience in which the student further develops intellectual capabilities through advanced studies. These studies are characterized by a greater degree of independence in the student and at the same time a close association with one or more members of the graduate faculty. Only those students showing distinct promise of completing the requirements for a graduate degree are admitted to the School of Graduate Studies. It is the student’s responsibility to be acquainted with all requirements related to a desired program and to fulfill these requirements.

The graduate degree is based on a program of study designed to accomplish a specific intellectual or professional goal. This program of study should be planned by the student at the earliest appropriate time (see specific degree programs) with the counsel of a faculty adviser. The program includes advanced studies in subject-matter areas and in most cases a research phase in which the student demonstrates capabilities for independent scholarly work.

The University of Alabama in Huntsville offers the following graduate degrees:
- Master of Administrative Science (M.A.S.)
- Master of Arts (M.A.) in Developmental Learning, English, History, and Mathematics
- Master of Science (M.S.) in Biological Sciences, Chemistry, Computer Science, and Physics
- Master of Science in Engineering (M.S.E.)
- Master of Science in Nursing (M.S.N.)
- Master of Science in Operations Research (M.S.O.R.)
- Doctor of Philosophy (Ph.D.) in Computer Science, Engineering and Physics
- Doctor of Philosophy (Ph.D.) in Chemistry and in Mathematics in cooperation with the University of Alabama in Tuscaloosa.

A limited schedule of graduate courses in education is offered also.
**Application Procedure**

Applicant must submit a completed graduate application form available in the Office of Admissions and Records and a nonrefundable application fee of $15. In addition, the student must request the following items be sent to the Office of Admissions and Records: two copies of previous academic records from each collegiate institution attended; scores of the Graduate Record Examination (GRE) from Educational Testing Service (ETS) or scores of the Graduate Management Admissions Test (GMAT) for the administrative science applicants.

Submit all application materials to the Office of Admissions and Records no later than dates specified in the UAH calendar.

Applicants should initiate action for admission at least six weeks before the registration date of the term for which admission is sought.

An applicant for a Ph.D. who has been previously admitted to the School of Graduate Studies must submit a completed re-evaluation form to the Office of Admission and Records.

**Requirements For Admission**

For admission to the School of Graduate Studies, applicant must hold a bachelor’s degree from UAH or from another approved institution. The following minimum requirements are acceptable to the graduate faculty; academic units may require higher averages (See admission requirements under department concerned).

**Unconditional Admission**

An applicant must have an overall grade-point average of at least 3.0 (A = 4.0) or at least 3.0 for the last 60 hours of work and must score at least 1,000 on the aptitude (verbal and quantitative) portion of the Graduate Record Examination (GRE). For the Masters of Administrative Science program, a minimum overall grade-point average of 3.0 and a minimum score of 450 on the Graduate Management Admission Test (GMAT). The advanced test of the GRE in the applicant’s proposed graduate field is also required if specified by the major department. Obtain application at the Office of Admissions and Records.

**Conditional Admission**

An applicant whose scholastic record does not fully meet the requirements for admission may, upon recommendation of the department chairman and with approval of the graduate dean, be admitted on a conditional basis if the applicant has taken the GRE or the MAT. For the Master of Administrative Science program, see the School of Administrative Science. The applicant must meet one of the following requirements: (1) a grade-point average of at least 2.5 (A = 4.0) or (2) a score on the aptitude portion of the GRE of at least 1,000 or (3) a grade-point average on the last 60 hours of at least 3.0 or (4) a score on the MAT of at least 50.
Nondegree Graduate Students
A student interested in earning graduate credit but who is not an applicant for a graduate degree at UAH may be admitted as a nondegree graduate student and continue on a term-by-term basis. Admission in this category may be granted to students submitting evidence of at least a bachelor's degree from an accredited institution. The student must maintain the same GPA grade requirements expected of the conditionally admitted graduate student. Courses taken while in this category must have prior approval by the department offering the course and the graduate dean.

Credit earned under a nondegree graduate status may be applied toward a graduate degree program following admission to the graduate degree program and approval of courses by the major department. If the student's previous record is admissible to the graduate program, then the student by petition may apply up to 12 semester hours toward the degree. If the student is not admissible, the nondegree graduate credit may be considered in lieu of irregular postgraduate requirements.

A Senior Taking Graduate Courses
A UAH senior may take up to 9 hours of courses (500-level or above) for graduate credit while completing requirements for the baccalaureate if the student has the following qualifications:
1. An approved degree application on file
2. An overall GPA or GPA for the last 40 hours of at least 3.5
3. A total course load of no more than 12 hours a term
4. Permission of the instructor for courses at the 600 level or above
The student initiates the process by filling out the Request for Approval of Graduate Credit by UAH Senior (available at the office of Admissions and Records) that requires the approval of the department chairman and graduate dean.

Unclassified Admission
A person who desires graduate credits without pursuing one of the degree programs may be admitted as unclassified if the qualifications for conditional admission are met.

Change in Major
A student previously admitted to the School of Graduate Studies to pursue a degree offered in one department may be admitted to a degree program in another department if the admission criteria of the latter department are met.

Irregular Postgraduate Status
For admission as an IPG student, see Admissions Information section.

Registration
A student must be admitted to the School of Graduate Studies to receive graduate credit for courses taken. Graduate students can schedule courses for other than graduate credit by so indicating on regular graduate registration forms. These courses will remain as originally designated.
The maximum course load of a graduate student is 10 semester hours a term. A student employed full-time (40 or more clock hours a week) can schedule no more than 3 semester hours of graduate work a term without permission of the faculty adviser or the departmental chairman if the student does not have an adviser. A full-time teacher working toward certification is limited to one course a term and a maximum of three three-hour courses an academic year (nine months). Schedule identified undergraduate prerequisites or deficiencies early in the graduate program.

The same requirements and procedures of attendance, conduct, withdrawals, examinations, and assigned tasks that apply to undergraduate students apply to graduate students.

Students working on a thesis must register for the thesis. Thesis and dissertation courses are graded on pass/fail basis.

**Scholastic Requirements**

The following scholastic requirements are those of the School of Graduate Studies (individual academic units may add additional requirements):

1. Overall grade average must be B or better on all graduate credit hours at UAH. In addition, the grade average must be B or better on courses taken in the current graduate degree program.
2. Credits toward a graduate degree count only with grades of C or better.
3. At least 50 percent of the hours required for a graduate degree must be completed in courses numbered 600 or above.
4. At least 50 percent of the courses on the Program of Study must be taught by UAH full-time faculty members.
5. At least 50 percent of the courses on the Program of Study must be taken on campus.

**Probationary Status**

1. A student admitted conditionally with an overall grade average of B or better for all graduate work attempted up to and including the term in which 12 semester hours are completed assumes the status of an unconditionally admitted student. Any time the overall grade average drops below a B average, the student will be placed on probation.
2. A student on probation is not a candidate for a degree.
3. Probationary status is removed by raising the overall grade average to B or better on all graduate work attempted in all terms up to and including the term in which 12 semester hours of graduate work are completed following the term on probation.
4. Failure to remove probation in the manner described results in dismissal from the School of Graduate Studies. In exceptional cases a student may be readmitted upon recommendation of the faculty in the major department and approval by the graduate dean.

**English Proficiency**

Success in the graduate school is strongly dependent upon a well-developed ability to communicate in English. A faculty member has the right to refuse written material submitted by a student if that material in the opinion of the member, does not meet minimum standards in English proficiency.
The Master’s Degree

To avoid wasted effort, students are encouraged to plan a program of study with the help of a faculty adviser before the completion of 12 semester hours. Courses taken without an approved program of study may not apply toward a degree. Students may follow one of two plans except where noted by some departments to satisfy the requirements for the master’s degree.

Plan One

Degree requirements under this plan include completion of 24 or more semester hours of graduate course work and the writing of an acceptable thesis.

The thesis should show evidence of the student’s capability for research and independent thought, as well as ability to interpret materials used and to write in clear, acceptable English. The subject must be in the major field and approved by a faculty committee of the major field by the chairman of the department and the graduate dean. All theses must be accessible to the general public.

A completed copy of the thesis must be submitted to the major department at least four weeks before the date on which the candidate expects to receive the degree. At least ten days before graduation, three copies of the thesis approved by the thesis committee, and the graduate dean, along with a receipt for the binding fee must be deposited in the Office of Admissions and Records. Theses must comply with the regulations set forth in the Guide for Preparation of Theses and Dissertations at The University of Alabama in Huntsville, which is available at the Office of School of Graduate Studies.

In exceptional cases, theses may be written in absentia. To obtain permission for such action, the student before leaving the university must select a thesis subject and submit to the chairman of the major department a satisfactory outline of the thesis, as well as satisfactory evidence that adequate facilities are available where work is to be done.

Plan Two

Degree requirements for the master’s degree under this plan include the completion of a minimum of 33 semester hours of graduate course work. A thesis is not required.

A candidate working under Plan Two may be required to participate successfully in a seminar or in problem courses for acquaintance with methods of research and appreciation of the place and function of original investigation in the field.

Transferred Credit

With permission of the major department, a student may transfer a maximum of 6 semester hours of acceptable graduate credit earned in an approved institution and may count it toward a master’s degree. The student may also petition the major department to recommend to the graduate dean that 6 additional hours of graduate credit be accepted. Such credit may not be more than six years old at the time of the student’s graduation and is transferable only if the student was enrolled in a graduate school at the time it was taken and has an overall average at the institution of B or better. Students who have graduate credits from another campus of the University of Alabama must complete a minimum of 12 semester hours of acceptable graduate credit at UAH to receive a master’s degree from UAH.
Candidacy for the Master’s Degree
A student admitted to a master’s degree program is a candidate for the master’s degree if the student is not on probation, has an approved program of study on file in the Office of Admissions and Records, has an average of B or better on all graduate work attempted at UAH, and has met all admission requirements.

Time Limit
All requirements for the master’s degree should be completed in not more than six years. Credit for individual graduate courses completed at UAH more than six years but less than ten before the completion of all requirements for the degree may be validated by special examination. Such an examination, given by the department in which the course is offered, can be taken only once and will be the equivalent of a final examination in the course. When the student passes the examination, the course is considered valid through the tenth year only.
Credit for courses transferred from other institutions cannot be validated at UAH.

Second Master’s Degree
A student is permitted to apply no more than 6 semester hours of credit earned for one graduate degree toward an additional master’s degree at UAH at the discretion of the major department.

Examinations
In addition to the regular course examinations, a final comprehensive examination is required of all candidates for the master’s degree. This examination may be written, oral, or both. If a thesis is submitted and a written examination given, there will be an oral examination that may be limited to the thesis. The candidate will be examined on the major subject or subjects and thesis in Plan One and on the course work in Plan Two. The oral examination is conducted by a committee of at least three members appointed by the graduate dean. A written notice of the time and place of examination is sent by the graduate dean to the candidate and each member of the committee at least two weeks before the examination date. The examination must be given at least two weeks before the date of graduation, and the results must be reported promptly to the graduate dean. A student may take the final oral or written examination only twice.

Application for Degree
Each candidate for an advanced degree must apply for the degree through the Office of Admissions and Records at least three months before it is to be conferred.

The Doctor of Philosophy Degree
The doctor of philosophy degree is a research-oriented degree awarded upon the demonstration of scholarly competence. The degree program at UAH is based on the successful completion of a program of study designed by the student and a faculty committee. The program includes mastery of certain research skills (languages, computer programming, statistics, and others ap-
proved by the Graduate Council) and an independent research project, the results of which are presented in the form of a dissertation.

The following specific degree requirements are applicable to all Ph.D. degree programs within the university. Additional requirements may be imposed by individual departments as shown in this catalog under the appropriate department.

**Application Procedure**

Students applying for admission to the School of Graduate Studies should follow the application procedure previously outlined. Graduate students who wish to work toward the Ph.D. must be admitted to a Ph.D. program.

**Course Requirements**

The School of Graduate Studies imposes no specific course or credit-hour requirements for the Ph.D. Course requirements are defined in the program of study and are determined by the appropriate department. Usually the student will take a majority of the courses in a given field and the remainder in a cognate field; this, however, is not a requirement.

The approval of the program of study should be accomplished as early as possible, but no later than the end of the first year of study. After approval, the program may only be amended by the supervisory committee.

**Transferred Credit**

All credit toward the Ph.D. which has not been earned at UAH must be acceptable graduate credit, transferred from an approved institution. Such credit is transferred only with approval of the major department.

**Foreign Language Requirements**

The requirement for foreign language competency may be satisfied by one of four methods, the particular method being determined by the department of the major:

1. Reading proficiency in two languages as determined by performance on the standardized Graduate School Foreign Language Tests of the Educational Testing Service (ETS) and administered at UAH. The required level of performance is to be established by the major department.

2. Reading proficiency in one language as above and demonstrated competence in a research skill.

3. An in-depth knowledge of one language as demonstrated by performance on the ETS Graduate School Foreign Language Test at a level appropriately higher than that for No. 1 above or completion of 12 semester hours in one language with a grade average of B or better.

4. Competency in two independent research skills: criteria for acceptability of these skills are to be determined by the department of the major.

**Residence Requirements**

For the award of a Ph.D., residence at UAH as a graduate student is required for evaluation of the student’s investigative abilities, independent thought, and scholastic progress by faculty members other than the major adviser.

Full-time residence at UAH for at least one continuous academic year or its equivalent during the student’s graduate career is judged to be minimum.
Therefore, as a general requirement, each student shall have successfully completed at least three academic years of residence beyond the bachelor’s degree. At least one of the three academic years shall have been in continuous full-time residence. Each department that offers a Ph.D. program may require additional residence and will define these additions and its approved equivalents in the section of the catalog describing its Ph.D. program. All research effort presented for residence credit toward the Ph.D. degree must be performed under the direction of a full member of the graduate faculty.

Supervisory Committee
A supervisory committee is appointed for each student working toward the Ph.D. usually after satisfactory completion of a preliminary examination administered by the major department. The supervisory committee is composed of at least three members from the major department and one or more from another department appointed by the graduate dean. The supervisory committee will examine the student’s research proposal for the dissertation.

Qualifying Examination
The qualifying examination is given under the auspices of the supervisory committee. The examination is a demonstration of proficiency in the subject-matter phase of the program of study and part shall be written and part, oral. The written portion shall become a part of the student’s permanent record. The examination may be taken twice if necessary. Further attempts will require the permission of the Graduate Council.

Time Limit
All requirements for the doctoral degree must be completed in no more than five years after the student has passed the qualifying examination.

Admission to Candidacy
Upon successful completion of the qualifying examination and the requirements for foreign language, the student may be admitted to candidacy for the degree. Admission to candidacy is based on the recommendation of the student’s supervisory committee and the appropriate department and is approved by the graduate dean. It is the responsibility of the student to secure the appropriate forms from the Office of Admissions and Records and to initiate the procedure for admission to candidacy at least six months preceding the award of the degree.

Dissertation
The dissertation is evidence that the student can independently identify a problem of contemporary significance through familiarity with the current literature in the major field, organize and execute a program of research, recognize and analyze the results, and present them in cogent, well-written exposition. Dissertation results are expected to be submitted for refereed scholarly publication. All dissertations must be accessible to the general public.

A completed copy of the dissertation must be submitted to the major department at least four weeks before graduation. At least ten days before graduation, three copies of the dissertation approved by the student’s committee and the chairman of the major department and a receipt for the binding fee must
be deposited in the Office of Admissions and Records. A copy of the dissertation must be submitted for microfilming to University Microfilms International by the time of graduation. Dissertations must comply with the regulations set forth in the Guide for Preparation of Theses and Dissertations at The University of Alabama in Huntsville, which is available at the Office of the School of Graduate Studies. Approval by the graduate dean is necessary before graduation.

Application for Degree
Each candidate for a Ph.D. degree must apply for the degree through the Office of Admissions and Records at least three months before it is to be conferred.

Final Examination
The final examination is an oral presentation of the thesis in the form of a seminar before the student’s committee and open to the members of the university community.

Cooperative Ph.D. Programs
Close cooperation on Ph.D. programs exists between departments on the UAH campus and departments on the Tuscaloosa campus authorized for carrying on doctoral work. Applicants to programs in mathematics and chemistry who desire to make maximum use of services in Huntsville may submit application materials to the UAH School of Graduate Studies. Upon being admitted, the student will be advised of the procedures for program planning.

The minimum residence requirements on the Tuscaloosa campus include two consecutive semesters (or, if specifically approved by the faculty concerned, one full summer of two terms preceded by or followed by one regular semester) and 18 semester hours of credits (including research, seminars, dissertations, special problems, or other assignments for which a credit equivalency may be established).

Cooperative Graduate Programs Between Auburn University and the University of Alabama
In some designated programs, a student enrolled in either Auburn University or any campus of the University of Alabama System may register as a transient student at the other institution with the approval of both graduate deans, or their representatives, and the department or school in which the student wishes to take the work. The amount of course work that may be taken by a student under such an arrangement will be determined by the supervisory committee with appropriate approvals at the other university.

A student earning a master’s degree or a six-year degree at either institution must complete at least one-half of the required course work at the institution granting the degree.

For a course to be applicable for credit above the six hours presently transferable toward a master’s degree or beyond the master’s toward a six-year degree, the course must be approved in advance by the student’s major department or school and the graduate dean.

The deans of the graduate schools will serve as liaison officers in arranging programs for which the additional hours may be transferred and other details.
Visiting Graduate Students

A cooperative arrangement exists between Alabama A&M University and UAH. Under this arrangement, a graduate student at one institution may request permission to attend a course at the other. Conditions governing the granting of permission include the following:

1. The student must be in good graduate standing.
2. The course desired is unavailable to the student at the home institution.
3. A visiting student is limited to one graduate course a term at the host institution except where the second course is a laboratory required to accompany the first course.
4. A visiting student must have prerequisites for the course.
5. The number of courses taken under this plan cannot exceed those allowed in the policy on transferred credit.
6. The student’s request requires the approval of the adviser, department chairman, and graduate dean.
7. Permission of the host institution is dependent upon availability of space for the visitor after its own students are accommodated.

Interested students should contact the Office of Admissions and Records for information.
The School of Mathematical and Natural Sciences

Acting Dean J. Hoomani, B.S., M.S., Ph.D., Professor of Mathematics

Realizing that the acquisition of scientific knowledge and expertise is not only a profession but also a vital support to other disciplines, the School of Mathematical and Natural Sciences offers programs designed to meet various educational, vocational and professional goals. Students may select programs of study for career opportunities in mathematical, life and physical sciences or as background requirements for professional studies in medicine, engineering and education. In addition, the faculty assists students in preparation for advanced studies and in planning research projects to enhance course work. By encouraging intellectual as well as technical development, the faculty seeks to introduce students to scientific inquiry as an orderly thought process.

Programs are administered by five academic departments, the dean's Office of Mathematical and Natural Sciences, and the Office of the School of Graduate Studies. Specific departmental degree requirements along with course descriptions are listed in the sections that follow.

Undergraduate Degrees and Study

The School of Mathematical and Natural Sciences awards the Bachelor of Science and the Bachelor of Arts degree. Majors are offered in Biological sciences, chemistry, computer science, mathematics, mathematics education and physics. A certificate program in environmental science is offered to undergraduates majoring in sciences or mathematics and to graduates with these majors. In addition, courses are offered in natural sciences and statistics.

Graduate Degree and Study

The School of Mathematical and Natural Sciences offers graduate programs which lead to the Master of Science degree in biological sciences, chemistry, computer science, mathematics and physics and to the Master of Arts in mathematics. Doctoral programs are offered in computer science and physics. The Doctor of Philosophy degree in chemistry and mathematics is available through a cooperative program with the University of Alabama, Tuscaloosa.
Biological Sciences Department

Professors Dimopoullos, Leonard, Wilson (chairman); Professor Emeritus Adams; Adjunct Professor Montgomery; Associate Professors Campbell, Eley, Modlin, Young; Adjunct Associate Professor Moore; Assistant Professors Garstka, Lawton; Adjunct Assistant Professor Meehan.

Undergraduate Programs

A student may elect a program leading to either a Bachelor of Arts or a Bachelor of Science degree. In most areas of biological interest, a Bachelor of Science degree is deemed more desirable; however, a Bachelor of Arts degree may be preferred in areas of concentration (AOC) relating biological sciences to some of the humanities, social sciences, and economics.

The biological sciences program must include BYS 113/114 or the equivalent. Although these cannot be counted toward a major, they will satisfy a portion of the general education requirements (GER). A major in biological sciences includes the following core courses: one course in anatomy and morphology (BYS 313/314, 317, 371, 372, 544, or 571), one course in physiology (BYS 313/314, 435, 531, 532, or 561), general genetics (BYS 319), one course in biochemistry (may be included in major or minor as BYS or CH), and one credit hour of seminar to be taken during junior or senior year. The seminar requirement can also be met at the Marine Environmental Sciences Consortium at Dauphin Island. BYS 313 or 314 each can satisfy only the anatomy or the physiology requirement. BYS 313 and 314 together can meet both the anatomy and physiology core requirements. BYS 492 is strongly recommended for students in curricula preparatory for graduate study. Additional hours elected to constitute the minimum of 30 semester hours required for a major in biological sciences may be taken in accordance with the individual student’s goal.

Curricula are available for students who elect premedical technology, preprofessional, graduate preparatory, environmental science, or secondary education programs. Curricula I-XI are offered as models of appropriate programs to fulfill the university’s degree requirements and achieve diverse goals in the biological sciences with related areas of emphasis. Any curriculum may be modified to fit individual aims with approval of the biology faculty.

All B.S. degree programs in biological sciences include 8 semester hours of physics (PH 101/102, or 111/112 required for certain programs), CH 113 or 331, CH 223, one biochemistry course in the major or minor, and 9 semester hours of mathematics including at least one calculus course. Biological science majors should take at least one course in statistics, which may be required in certain programs. In some instances ST 281 can count toward mathematics GER for the B.S. degree.

A minor in biological sciences consists of 21 semester hours that include BYS 113, 114, and 319 with at least 6 hours numbered 300 or above. Additionally, CH 101, 105, and 113 are required ancillary courses for a biological science minor. A course in biochemistry (BYS or CH 301) supports the minor but is not required.

Curriculum I

B.A. degree appropriate for biological sciences major with an associated minor in social sciences.
### Curriculum II

B.A. or B.S. degree with a major in Biological Sciences. This plan meets requirements for an Alabama Class B High School Teachers Certificate.

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER (humanities and social sciences)</td>
<td>30-36</td>
</tr>
<tr>
<td>Biological sciences core courses and electives</td>
<td>30-32</td>
</tr>
<tr>
<td>Chemistry (to include 113 or 331)</td>
<td>8-11</td>
</tr>
<tr>
<td>Physics</td>
<td>8</td>
</tr>
<tr>
<td>Mathematics</td>
<td>3-6</td>
</tr>
<tr>
<td>Humanities, social sciences, economics, or associated cluster</td>
<td>21</td>
</tr>
<tr>
<td>Electives</td>
<td>27-30</td>
</tr>
</tbody>
</table>

**NOTES:**
1. This curriculum may require more than the minimum 128 total semester hours.
2. Students considering this curriculum should consult the Department of Education early in their program.
3. A GENERAL SCIENCES COMPOSITE MAJOR covering the areas of chemistry, biological sciences, environmental sciences and physical sciences is possible under this curriculum. Interested students should consult the Biological Sciences or Education Departments.

### Curriculum III

B.S. degree, preparatory for general graduate study.

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER (humanities and social sciences)</td>
<td>30-36</td>
</tr>
<tr>
<td>Biological sciences core courses and biological sciences electives</td>
<td>30-32</td>
</tr>
<tr>
<td>Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362 (341 desirable)</td>
<td>22</td>
</tr>
<tr>
<td>Mathematics—(depending on placement)</td>
<td>9</td>
</tr>
<tr>
<td>Physics—PH 101, 102 (PH 111, 112 may be taken)</td>
<td>8</td>
</tr>
<tr>
<td>Electives</td>
<td>12-15</td>
</tr>
</tbody>
</table>

### Curriculum IV

B.S. degree with chemistry minor, preparatory for graduate study.

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER (humanities and social sciences)</td>
<td>30-36</td>
</tr>
<tr>
<td>Biological sciences core courses and biological sciences electives</td>
<td>30-32</td>
</tr>
<tr>
<td>Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362</td>
<td>22</td>
</tr>
<tr>
<td>Mathematics—(depending on placement)</td>
<td>9</td>
</tr>
<tr>
<td>Physics—PH 101, 102, 201, (PH 111, 112 may be taken)</td>
<td>8</td>
</tr>
<tr>
<td>Electives</td>
<td>12-15</td>
</tr>
</tbody>
</table>
Curriculum V
B.S. degree with physics-chemistry cognate studies, preparatory for graduate study.

Semester Hours
GER (humanities and social sciences) ........................................... 30-36
Biological sciences core courses and biological sciences electives .......... 30-32
Chemistry—CH 121, 123, 125, 126, 331, 332, 335, 361, 362 ................. 18
Mathematics—(depending on placement) ........................................... 15
Physics—PH 111, 112, 201, 241, 331, 351 ........................................ 20
Electives ....................................................................................... 12

Curriculum VI
B.S. degree, premedical, predental, preveterinary. (See chemistry section for an alternate premedical curriculum.)

Semester Hours
GER (humanities and social sciences) ........................................... 30-36
Biological sciences core courses and biological sciences electives (to include either BYS 317 and 361 or BYS 361, 543, 544, and 545) .................................................. 30-32
Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 333, 335, 336 (341 desirable) .............................................. 21
Mathematics—MA 121, 153, 154 .................................................... 9
Physics—PH 111, 112 .................................................................. 8
Electives ....................................................................................... 16

Curriculum VII
B.S. degree, microbiology emphasis, preparatory for: (a) the National Registry of Microbiologist Examination for Registered Microbiologists with the American Academy of Microbiology; (b) graduate study in microbiology.

Semester Hours
GER (humanities and social sciences) ........................................... 30-36
Mathematics (depending on placement) ........................................... 9
Physics—101, 102, or 111, 112 ..................................................... 8
Chemistry—121, 123, 125, 126, 223, 331, 332, 335, 361, 362 ................. 22
Electives (to include statistics if not in GER) ........................................ 12
Biological sciences core courses and BYS 221, 421, 430, 435, 521, 525) .... 33

Curriculum VIII
B.S. degree, premedical technology emphasis. This curriculum satisfies academic requirements for a B.S. in biological sciences and includes prerequisites for acceptance in clinical training in medical technology. The clinical phase, which is taken after the B.S. degree has been earned, consists of a twelve-month internship in an accredited medical technology clinical training program of the student’s choice. Upon successful completion of the clinical component the candidate is eligible for certification as a medical technologist. The following curriculum comprises the preclinical component. Completion of this four-year program does not automatically ensure acceptance into a clinical training program.

Semester Hours
GER (humanities and social sciences) ........................................... 30-36
Physics—PH 101, 102 .............................................................. 8
Mathematics (depending upon placement) ................................................................. 9
Biological sciences—BYS 221, 313, 314, 319, 421,
   430, 521, 525, seminar ..................................................................................... 33
Chemistry—121, 123, 125, 126, 223, 331, 332, 335, 361, 362 .................... 22
Electives (CS 113 is recommended; statistics must be included if not in GER). ................................................................. 12

Curriculum IX
B.S. degree, preparatory for graduate study in biological sciences-
mathematics (biometrics).

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER (humanities and social sciences) .......... 30-36</td>
</tr>
<tr>
<td>Biological sciences core courses and biological sciences electives .......... 30-32</td>
</tr>
<tr>
<td>Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362 .............. 22</td>
</tr>
<tr>
<td>Mathematics—MA 153, 154, 233, 244, 251, 385, 585 .................... 21</td>
</tr>
<tr>
<td>Physics—PH 101, 102, or 111, 112 ......................... 8</td>
</tr>
<tr>
<td>Electives (ST 281, 287 recommended) ............... 12</td>
</tr>
</tbody>
</table>

Curriculum X
B.S. degree, environmental biology emphasis, preparatory for graduate study in ecology or environmental science.

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER (humanities and social sciences) .......... 30-36</td>
</tr>
<tr>
<td>Biological sciences core courses, biological sciences electives, and BY 221, 312, 371 or 378, and two from BYS 561, 562, 563, and 564 .......... 30</td>
</tr>
<tr>
<td>Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362 .............. 22</td>
</tr>
<tr>
<td>Physics—PH 101, 102, or 111, 112 ......................... 8</td>
</tr>
<tr>
<td>Mathematics—(including ST 281 if Level III placement) .......... 9</td>
</tr>
<tr>
<td>Environmental science—ES 202 .............. 4</td>
</tr>
<tr>
<td>Computer science—CS 113, 208 ......................... 6</td>
</tr>
<tr>
<td>Electives (to include statistics if not mathematics Level III placement) ........ 12</td>
</tr>
</tbody>
</table>

Curriculum XI
B.S. degree, composite major in biological-environmental sciences. An additional 6 hours from advanced ES courses with this program qualifies student for an environmental science certificate.

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER (humanities and social sciences, EC or PSC recommended) .......... 36</td>
</tr>
<tr>
<td>Mathematics (including ST 281 if Level III placement) .......... 9</td>
</tr>
<tr>
<td>Physics—PH 101, 102, or 111, 112 ......................... 8</td>
</tr>
<tr>
<td>Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362 .............. 22</td>
</tr>
<tr>
<td>Environmental science—ES 102, 303, or 304, 311, 321 .......... 13</td>
</tr>
<tr>
<td>Biological sciences—BYS 113, 114, 221, 312, 319, and MS 507, BYS 531, or BYS 561 .......... 23</td>
</tr>
<tr>
<td>BYS electives ......... 12-14</td>
</tr>
<tr>
<td>One from 315, 317, 378 ......................... 4-5</td>
</tr>
<tr>
<td>One from 562, 563, 564 ......................... 4</td>
</tr>
<tr>
<td>One from 364, 368, 372 ......................... 4-5</td>
</tr>
<tr>
<td>Computer science—CS 113 ......................... 3</td>
</tr>
<tr>
<td>Free electives (to include statistics if not MA Level III placement) ........ 9-11</td>
</tr>
</tbody>
</table>

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Graduate Program

The biological sciences graduate faculty in cooperation with the biology graduate faculty of Alabama Agricultural and Mechanical University (A&MU) offers courses in biological sciences to satisfy requirements for a Master of Science degree in biological sciences with emphasis in cell and development biology, ecology, entomology, genetics and molecular biology, microbiology, physiology, and systematics. A minimum of 25 percent of biological sciences course requirements must be taken at each institution. A minimum of 50 percent of the graduate program must be taken at the 600 level.

A student may earn the degree under one of the following three plans after successfully completing the requirements listed under it:

Plan I—Master of Science with thesis
a. Graduate course work of 24 semester hours of an approved program
b. Acceptable thesis
c. Comprehensive final examination

Plan II—Master of Science without thesis
a. Approved program of 33 semester hours
b. Acceptable master's report (library search, survey, or experimentation)
c. Comprehensive final examination

Plan III—Master of Science with education option
a. Approved program of 24 semester hours in biology and 9 in education
b. Acceptable master's report
c. Comprehensive final examination

In addition to fulfilling general requirements for admission to graduate study, (see Graduate Studies), applicant must show competence in an area of life science related to the proposed area of study, complete one year of chemistry including one term of organic chemistry or biochemistry, and have a minimum GPA of 2.5 (of a possible 4.0) or 1.5 (of a possible 3.0) in the major area of concentration. The graduate record examination, aptitude and advanced test, is required of all students.

Courses in Marine Sciences

Select courses in marine sciences, available through the Marine Environmental Sciences Consortium, may be taken for credit at UAH toward a biological science major or minor, a minor in marine sciences, or a Master of Science degree in biological science. Biological science majors electing a marine science minor generally would not take MS courses in the minor that were principally biologically oriented. Courses for which credit is not given for a biological science major or minor can be taken as electives. All programs of study that involve marine science courses must be approved by the MESC-UAH liaison officer.
Biological Sciences (BYS)

100 Introduction to Health Professions 1 hr.
Career options for undergraduate students interested in health professions. Basics of health-care delivery systems and terminology of health care. Primarily for freshmen and sophomores. No BYS major or minor credit. (Same as MED 100).

113 General Biology 4 hrs.
Biological principles emphasizing botanical material; cellular and subcellular structure and function; basic metabolic pathways (glycolysis, Kreb's cycle, protein and fatty acid synthesis); photosynthesis and ontogeny of tissues and phylogenetic relationships in the plant kingdom. One lab a week. Lab fee: Level 3.

114 General Biology 4 hrs.
Continuation of biological principles but emphasizing animal kingdom; structure and function of tissues, organs, and organ systems; genetics, development, phylogenetic relationships, and ecology. One lab a week. Lab fee: Level 3. Prerequisite: BYS 113.

214 Infection and Immunity 4 hrs.
Principles of microbiology with emphasis on infectious disease of humans; epidemiological and immunological aspects. No credit for students who have credit for BYS 221 or advanced microbiology courses. Two 2-hour labs a week. Lab fee: Level 4. Prerequisites: BYS 114, CH 101.

221 General Microbiology 4 hrs.
Cultivation and observation of microorganisms and their relation to foods, water, and industrial processes; environment and disease. Two 2-hour labs a week. Not recommended for students in School of Nursing. No credit for students who have completed BYS 214. Take no later than sophomore year. Lab fee: Level 4. Prerequisites: BYS 114, 113; CH 101 or 121 or equivalents.

230 Cultivation of Shrubs and Basic Landscape Principles 2 hrs.
Identification and use of the most widely used shrubs in landscape design for northern and central Alabama. Herbaceous annuals and perennials. Basic landscape design. Lab fee: Level 3. Prerequisite: BYS 113 or equivalent.

238 Local Flora 2 hrs.
Laboratory course with basic taxonomical procedures and determination of local angiosperms, primarily dicots. Basics of classification techniques and process of speciation. Field trips required. Lab fee: Level 2.

301 Elementary Biochemistry 3 hrs.
Biochemistry and energetics of living cells, metabolism, structure and function of carbohydrates lipids, proteins and nucleic acid. Enzymes, coenzymes, vitamins, blood, endocrine glands, DNA synthesis and gene expression, nutrition, drugs and biochemistry of specialized tissues. Prerequisites: BYS 114 and CH 113 or 123. (Same as CH 301).

312 Principles of Ecology 4 hrs.
Ecological principles controlling plant and animal populations. Development of ecosystems, communities, and habitats. One four-hour lab a week. Lab fee: Level 3. Field trips required. Prerequisites: BYS 113, 114, 238, CH 121.

313 Anatomy and Physiology I 4 hrs.
Structure and function of the human body. Physiology and anatomy of major organs, organ systems, and their interactions. Not recommended for students preparing for professional schools or graduate study in physiology or development. One lab a week. Lab fee: Level 4. Prerequisites: BYS 114, CH 101, and 105 (CH 113 recommended).
314 Anatomy and Physiology II
4 hrs.
Continuation of BYS 313 stressing structural and functional relationships of major organs, organ systems, and their interdependent regulation. Not recommended for students preparing for professional schools or graduate study in physiology or development. One lab a week. Lab fee: Level 4. Prerequisites: BYS 313, CH 101 and 105 (CH 113 recommended).

315 Ichthyology
4 hrs.
Classification, anatomy, physiology, and ecology of freshwater and marine fishes. Emphasis on fishes of North Alabama. Laboratory and field trips required. Lab fee: Level 3. Prerequisite: BYS 114.

317 Vertebrate Zoology
5 hrs.
Morphology of vertebrate animals. Relationship of organs and systems and their phylogenetic significance. Two three-hour labs a week. Lab fee: Level 4. Prerequisite: BYS 114.

318 Vertebrate Reproduction
3 hrs.
General treatment of the major concepts and controversial areas of comparative vertebrate reproduction: ecological and evolutionary aspects, development of reproductive functions and sexual behavior, seasonal breeding and other topics of current interest. Prerequisites: BYS major; BYS 114.

319 General Genetics
3 hrs.
Hereditary basis of all living organisms, including the structure and function of genes and gene products and reproductive processes. Mendelian principles and modern genetic techniques and applications. Prerequisites: BYS 114 and CH 101 or equivalent.

320 Genetics Laboratory
1 hr.
Practical applications of modern genetic techniques. One 3-hour lab a week. Lab fee: Level 3. Prerequisite or concomitant: BYS 319.

340 Introduction to Cellular and Developmental Biology
4 hrs.
Modern approach to embryology relating cell structure and function to mechanisms involved in development. One laboratory a week. Lab fee: Level 4. Prerequisites: BYS 114, CH 101, 105, 113 or 331. BYS 319 recommended. It is strongly recommended that biological science majors and preprofessional students take BYS 543, 544, and 545 instead of BYS 340.

361 General Biochemistry
3 hrs.
Molecules that comprise living systems. Their nomenclature structure, properties, and functions in metabolism. Enzymatic properties and function, major and minor biosynthetic and catabolic pathways, their interrelations and control mechanisms. Glycolysis and gluconeogenesis, Kreb's cycle, photosynthesis and lipids, amino acids and proteins, and nucleic acids. Prerequisites: BYS 114, CH 332, and CH 335. (Same as CH 361).

362 General Biochemistry Laboratory
1 hr.
Practical experience in isolation, qualitative identification, and quantitative estimation of biomolecules. One 4-hour lab a week. Lab fee: Level 4. Prerequisite or parallel: CH 361. (Same as CH 362).

364 Biogeography
3 hrs.
Principles of plant and animal distribution and dispersal, using the communities of North America as prime examples. Prerequisites: BYS 113, 114, 312.

368 Dendrology
4 hrs.
Sequel to local flora BYS 238, in alternate years in winter term. Identification of trees and shrubs on basis of winter twigs, buds, and fruits. Dating of trees and climatic patterns by dendro-chronological techniques, distribution and habitat of local woody gymnosperms and wood angiosperms, anatomical characteristics of selected commercial woods, diseases of woody plants, and their evolutionary and phylogenetic relationships. One 4-hour lab a week. Lab fee: Level 3. Prerequisites: BYS 113, BYS 238 recommended.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>371</td>
<td>Nonvascular Cryptogamic Botany</td>
<td>5 hrs.</td>
<td>Introduction to the biology of ray fungi, cellular and slime molds, fungi, algae, lichens, liverworts, hornworts, and mosses, emphasizing their ontogeny, structure, and phylogenetic lines of development. Two 3-hour labs a week. Lab fee: Level 4. Prerequisite: BYS 113.</td>
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</tr>
<tr>
<td>372</td>
<td>Biology of Vascular Plants</td>
<td>5 hrs.</td>
<td>Comparative anatomy and morphology of vascular plants and their relationship in various phylogenetic lines of development. Vascular cryptogams as well as ferns, gymnosperms, and angiosperms. Not a field course. Two 3-hour labs a week. Lab fee: Level 3. Prerequisite: BYS 113.</td>
<td></td>
</tr>
<tr>
<td>378</td>
<td>Invertebrate Zoology</td>
<td>5 hrs.</td>
<td>Invertebrate phyla emphasizing anatomy, morphology, embryology, ecology, and phylogenetic relationships. Two 3-hour labs a week. Lab fee: Level 4. Prerequisite: BYS 114.</td>
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</tr>
<tr>
<td>421</td>
<td>Introduction to Medical Microbiology</td>
<td>5 hrs.</td>
<td>Medically significant microorganisms and their relation to human diseases. Bacterial, fungal, and viral agents and their properties, pathogenesis, and laboratory diagnosis. Two 3-hour labs a week. Lab fee: Level 4. Prerequisite: BYS 221, BYS or CH 361, and BYS 430 recommended.</td>
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<tr>
<td>429</td>
<td>Animal Histology</td>
<td>4 hrs.</td>
<td>Microscopic study of the various tissues and organs of the mammalian body. Relationship of cell and organ structure to function. Two 2-hour labs a week. Lab fee: Level 3. Prerequisite: BYS 114 or equivalent.</td>
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<tr>
<td>430</td>
<td>Immunology</td>
<td>4 hrs.</td>
<td>Basic course in immunology. Immunoglobulins, antigens, immune responses, complement, immediate and cell-mediated hypersensitivities, and transplantation and tumor immunology. One 4-hour lab a week. Lab fee: Level 4. Prerequisite: BYS 221 and biochemistry strongly recommended.</td>
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<tr>
<td>435</td>
<td>Bacterial Physiology and Metabolism</td>
<td>4 hrs.</td>
<td>Aspects of bacterial physiology such as nutrition, growth, energy, and biosynthetic mechanisms of bacteria. One 4-hour lab a week. Lab fee: Level 4. Prerequisite: BYS 221. Biochemistry strongly recommended.</td>
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<tr>
<td>436</td>
<td>Physiological Psychology</td>
<td>3 hrs.</td>
<td>Functional analysis of neural and endocrine systems underlying behavior. Prerequisites: (either a or b): (a) 15 hrs. of PY or approval of instructor; (b) BYS 114 or 313, and 6 hrs. of PY or approval of instructor. (Same as PY 436).</td>
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<tr>
<td>455</td>
<td>General Entomology</td>
<td>4 hrs.</td>
<td>Classification, habits, and economic importance of insects including their collection, preservation and identification. One 3-hour lab a week. Lab fee: Level 3. Prerequisite: BYS 114.</td>
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<tr>
<td>490</td>
<td>Special Topics in Biological Sciences</td>
<td>1-4 hrs.</td>
<td>Literature search relative to topics of special interest under direct supervision of instructor.</td>
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<tr>
<td>492</td>
<td>Undergraduate Research</td>
<td>2-4 hrs.</td>
<td>Individual investigations into biological problems under direct supervision of instructor. For advanced-level biological science students with biological science grade of 3.5 or higher.</td>
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275
above. May be taken at the Marine Environmental Sciences Consortium, Dauphin Island, Alabama. Lab fee: Level 2 for 2 hours, Level 3 for 3 hours, and Level 4 for 4 hours. Prerequisite: approval of instructor.

496, 497, 498, 499 Seminar 1 hr. each
Student discussions and presentations of biological literature from current library monographs and journals. Prerequisite: junior standing. Pass/fail grading. Biological sciences major requirement, one seminar. No more than 3 seminar credits can count in biological sciences major. May be taken at the Marine Environmental Sciences Consortium.

Advanced Undergraduate — Graduate Courses

510 Radiation Biology (A&MU) 4 hrs.
Characteristics of radioisotopes, detection and counting techniques and instrumentation, tracer techniques, health and safety system. Prerequisite: consultation with instructor.

511 Biological Control (A&MU) 4 hrs.
Components of resistance, use of parasites, predators and microorganisms, foreign exploration, shipment, release and establishment of imported parasites and predators.

512 Histotechniques (A&MU) 3 hrs.
Microscopic study of the various tissues and organs of the animal systems.

521 Medical Mycology (UAH) 4 hrs.
Comprehensive study of fungi pathogenic to man; their properties, pathogenesis, and laboratory diagnosis. Two 2-hour labs a week. Lab fee: Level 4. Prerequisite: BYS 421; BYS 430 is recommended.

522 Microbial Physiology (A&MU) 3 hrs.
Relationship between structure and biochemical functions in microorganisms. Lab fee: Level 4. Prerequisite: microbiology, organic chemistry, and biochemistry.

523 Principles of Virology (A&MU) 4 hrs.
Principles of viral infectivity, multiplication, and chemical constitution; laboratory techniques for their isolation, cultivation, identification, and enumeration. Prerequisite: BYS 221.

524 Mycology (UAH and A&MU) 4 hrs.
Lines of phycymycetes using representative species; various series of actinomycetes; representative pathogenic (crop and vegetative pathogens) and nonpathogenic heterobasidiomycetidae organisms; orders and families of homobasidiomycetidae. Ontogenetics, cellular, and structural study applied to all divisions, classes, series, orders and families. Lab fee: Level 4.

525 Medical Parasitology (UAH) 5 hrs.
Protozoa and helminths parasitic for man and their laboratory identification. Arthropods in relation to their roles as vectors. Two 2-hour labs a week. Lab fee: Level 3. Prerequisite: BYS 221 or equivalent.

526 Microbial Ecology (A&MU) 4 hrs.
Relationship of soil and aquatic microorganisms and their importance in ammonification, nitrification, and other biological processes. Prerequisite: BYS 221.

531 Plant Physiology (UAH) 4 hrs.
A general introductory study of life processes of plants, including water relations, mineral utilization, metabolism, photosynthesis, digestion, respiration, assimilation, and growth as affected by growth hormones. One 3-hour lab a week. Lab fee: Level 3. Prerequisites: BYS 113, 371, or 372, CH 113 or 331.
532 Animal Physiology (UAH) 4 hrs.
Basic course in organismal function. Membrane physiology with respect to transport phenomena, muscle, nerve, synapse, and sensory receptor physiology. Physiology of respiration, heart, circulation, kidney, and gastrointestinal tract as individual systems with emphasis on regulation. One laboratory session a week illustrating physiological principles discussed in lecture. Lab fee: Level 4. Prerequisite: senior classification with a major or cluster in biological science; 16 hours completed in AOC and CH 113 or 331 or graduate standing.

533 Medical Physiology I (A&MU) 4 hrs.
Nerve and muscle cell function, fluid and electrolyte environment of body tissues, blood, heart, circulatory, and nervous systems. Prerequisite: organic chemistry, preferably biochemistry.

534 Medical Physiology (A&MU) 4 hrs.
Continuation of Mammalian Physiology I with consideration of kidney function, respiratory, digestive, reproductive, and endocrine systems. Prerequisite: Medical Physiology I.

535 Endocrinology (A&MU) 4 hrs.
Current developments on anatomy, physiology, chemistry, and regulations of major endocrine glands. Laboratory sessions in biological and chemical assays of hormones. Prerequisite: ZOO 409.

540 Molecular Biology (A&MU) 4 hrs.
Structure, behavior, and function of larger biological molecules including biological oxidations, metabolism of carbohydrates, lipids, amino acids, and genetic aspects of metabolism. Prerequisite: CHE 301 Organic Chemistry.

543 Cellular and Developmental Biology (UAH) 3 hrs.
Cellular structure and function coupled with relevant aspects of developmental mechanisms. Lectures on mitosis, gametogenesis, nuclear-cytoplasmic interactions, role of genes in development, mechanisms of hormone action on cellular function and development and cell movements and affinities. Prerequisites: BYS 113, 114, 319, CH 101, 105, and 113 or CH 123, 126 and 331 (may be taken concomitantly).

544 Cellular and Developmental Biology (UAH) 3 hrs.
Continuation of BYS 543 and selected morphogenesis of germ-layer derivatives. Prerequisite: BYS 543.

545 Cellular and Developmental Biology Laboratory (UAH) 2 hrs.
Take course after BYS 543 and concurrently with BYS 544. Lab fee: Level 5.

546 Cytogenetics (A&MU) 4 hrs.
Analysis of composition, morphology, and behavior of genes, especially as they relate to function, development, and heredity. Prerequisite: BIO 406.

547 Biochemistry I (UAH) 3 hrs.
Structural chemistry and function of biomolecules, mechanism of biochemical reactions, enzyme kinetics, and energy transfer. Prerequisite: CH 333 or CH or BYS 361. (Same as CH 561).

548 Biochemistry II (UAH) 3 hrs.
Metabolism, biosynthesis of macromolecular precursors, storage, transmission, expression of genetic information, and molecular physiology. Prerequisite: CH 561 or BYS 547. (Same as CH 562).

549 Analytical Biochemistry Laboratory (A&MU) 2 hrs.
Advanced laboratory course dealing with modern techniques of molecular biology and biochemistry.
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<tr>
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<tbody>
<tr>
<td>551</td>
<td>Insect Physiology (A&amp;MU)</td>
<td>4 hrs.</td>
<td>Metabolism and utilization of carbohydrates, lipids, and nitrogen compounds; energy production, neuromuscular mechanisms, hormones and morphogenesis; role of organs and organ systems in metabolism. Prerequisites: general entomology or equivalent, advanced biochemistry.</td>
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<tr>
<td>552</td>
<td>Insect-Pest Management (A&amp;MU)</td>
<td>4 hrs.</td>
<td>Insect surveys, ecological basis for control, plant and animal resistance to insects, control by parasites, predators, microorganisms, management by genetics principles, chemical attractants, chemical repellents, sterilization, insecticides, and integrated systems of pest management. Prerequisite: general entomology or advanced applied entomology.</td>
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<tr>
<td>553</td>
<td>Insect Taxonomy and Morphology (UAH &amp; A&amp;MU)</td>
<td>4 hrs.</td>
<td>Classification of insects, external and internal anatomy of insects with emphasis on comparative and functional aspects. Lab Fee: Level 3. Prerequisite: BYS 455.</td>
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<tr>
<td>560</td>
<td>Environmental Biology (A&amp;MU)</td>
<td>3 hrs.</td>
<td>Principles of interaction between living systems and their resources. Current problems in management of our natural resources including new approaches in management of pest populations.</td>
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<tr>
<td>561</td>
<td>Physiological Ecology (UAH)</td>
<td>4 hrs.</td>
<td>Physiological and behavioral responses of organisms to natural changes in their chemical and physical environment. One 3-hour lab a week. Lab fee: Level 3. Prerequisite: BYS 312 or approval of instructor. BYS 361 or 552 recommended.</td>
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<tr>
<td>562</td>
<td>Community Ecology (UAH)</td>
<td>4 hrs.</td>
<td>Detailed consideration of ecological principles and concepts, as well as biotic and abiotic factors relative to development of plant communities and ecosystems. One 4-hour lab a week. Lab fee: Level 3. Field trips required. Prerequisites: BYS 312 and taxonomy.</td>
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<tr>
<td>564</td>
<td>Limnology (UAH)</td>
<td>4 hrs.</td>
<td>Fresh-water environments and organisms exemplified by lakes, ponds, and streams in North Alabama. Laboratory and required field trips. One 4-hour lab a week. Occasional Saturday field trips required instead of week's laboratory session. Lab fee: Level 4. Prerequisites: BYS 312, 315, 371 or 378, or approval of instructor.</td>
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<tr>
<td>570</td>
<td>Plant Pathology (A&amp;MU)</td>
<td>4 hrs.</td>
<td>History, nonparasitic, and parasitic diseases incited by bacteria, fungi, plasmodiophorales, nematodes, and viruses. Disease control through exclusion, eradication, protection, and post resistance. Prerequisite: BIO 344.</td>
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<tr>
<td>571</td>
<td>Plant Anatomy (UAH and A&amp;MU)</td>
<td>4 hrs.</td>
<td>Ontogeny, differentiation, and maturation of tissues and organs of angiosperms. Problems in growth and development of an angiosperm, using histological techniques. Two 3-hour labs a week. Lab Fee: Level 4. Prerequisite: BYS 372 or approval of instructor.</td>
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<tr>
<td>578</td>
<td>Aquatic Arthropod Biology</td>
<td>4 hrs.</td>
<td>Systematics, Physiology, Ecology and Importance of the Crustacea, Insecta and Arachnida that inhabit freshwater and estuarine ecosystems. Particular attention will be</td>
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</table>
given to those arthropods common to the aquatic systems in and around Alabama. Since all field trips are required, prospective students should consult with the instructor prior to registration. Lab fee: Level 4. Prerequisite: BYS 378.

590 Problems in Biological Sciences (A&MU, Plan III Only) 4 hrs.
Problems of elementary and secondary school teachers of science in all areas of biological sciences. Relations of biological organisms to their environment, stressing climatic and soil factors that influence their distribution and adaptations. Provision for individual investigation in biological science.

621 Pathogenic Bacteriology (UAH) 4 hrs.
Detailed study of bacteria that cause infections in man. Mechanisms of pathogenicity and host-parasite relationships. Two 2-hour labs a week. Lab fee: Level 4. Prerequisites: BYS 361, 421, 430, or equivalents, or approval of instructor.

622 Applied and Industrial Microbiology (A&MU) 4 hrs.
Examine by microbiological assay sewage disposal and waste water treatment plants. Microorganisms of industrial importance in biological production of antibiotics, vitamins, organic acids, and alcohols. Prerequisite: microbiology.

623 Advanced Virology (A&MU) 4 hrs.
Outline of field of virology stressing molecular biology of virus replication. Immunology, genetics, and epidemiology. Bacterial and vertebrate viruses although some discussion of plant and insect viruses. Prerequisites: Microbiology, Principles of Virology.

624 Immunology (UAH) 4 hrs.
Theoretical and practical aspects of immunology. Current areas of immunology that are controversial. One 4-hour lab a week. Lab fee: Level 4. Prerequisites: BYS 361 and BYS 430 or approval of instructor.

631 Medical Pharmacology (A&MU) 5 hrs.
Lecture and laboratory course. Drug-receptor interaction, kinetics of drug absorption, distribution and elimination, and discussion of drugs affecting different systems. Pharmacogenetics, toxicity, mutagenesis, carcinogenesis, and drug interactions. Mechanism of action of drugs in relation to their use as therapeutic agents in medicine. Prerequisites: Medical Physiology I and II.

632 Cardiovascular Physiology (A&MU) 3 hrs.
Mechanisms of cardiac muscle excitation and interaction. Analysis of peripheral circulation. Neural regulation of circulation. Angiograph, electrocardiography, and vectorcardiography as diagnostic tools. Prerequisites: Medical Physiology I and II.

633 Endocrinology (UAH) 3 hrs.
Anatomy, physiology, and biochemistry of endocrine glands. Systemic effects of hormones, their regulation, integration, and mechanisms of action. Prerequisites: BYS 361, 532 or equivalent, or approval of instructor.

641 Advanced Cell Biology (UAH and A&MU) 4 hrs.
Integrated approach to fine structure and function of various cellular processes. Particular aspects of cellular processes each term, e.g., motility in cells and cellular differentiation. Laboratory included. Lab fee: Level 4. Prerequisite: Cellular and Developmental Biology or approval of instructor.

642 Advanced Cell Physiology (A&MU) 4 hrs.
Biochemical and biophysical cytology. The cell as matter, life history of the cell, molecular basis of cellular activities, enzymes and energy conversions, functional localizations in subunits of the cell, mechanisms of motility, structure and function of cell membranes, effects of radiation on cells, biochemical control mechanisms, cellular differentiation and interaction between cells, hypotheses of cellular origins. Prerequisites: molecular biology, physics, cytology, biochemistry. Laboratory included.
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<tbody>
<tr>
<td>643</td>
<td>Microscopy (UAH)</td>
<td>4 hrs.</td>
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<td>Introduction to the various methods of preparation for transmission electron microscopy and analysis of electronmicrographs. Supporting techniques such as phase microscopy, autoradiography, scanning electron microscopy, negative staining, and cytchemistry. Lab fee: Level 6. Prerequisites: graduate standing and approval of instructor.</td>
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<tr>
<td>644</td>
<td>Topics in Cell and Developmental Biology and Biological Fine Structure (UAH)</td>
<td>2 hrs.</td>
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<td></td>
<td>Discussion of current topics in cell biology with emphasis on student participation. Both plant and animal cells will be emphasized. Depending on the number of students, some terms may be devoted to short research problems. Prerequisites: BYS 543 and 643 or approval of instructor.</td>
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<tr>
<td>645</td>
<td>Human Cytogenetics and Its Clinical Application (A&amp;MU)</td>
<td>3 hrs.</td>
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<td>Review of normal human chromosome structure and normal chromosome segregation and morphology with clinical consideration.</td>
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<tr>
<td>646</td>
<td>Molecular Genetics (UAH and A&amp;MU)</td>
<td>3 hrs.</td>
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<td>Molecular mechanisms underlying genetic principles. Structure of genes and chromosomes; primary, secondary, and tertiary structure of DNA; DNA replication; genetic recombination; RNA transcription; translation and genetic code; regulation of gene function; evolution at molecular level. Prerequisites: BYS 319 and BYS-CH 361.</td>
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<tr>
<td>647</td>
<td>Enzymology (UAH)</td>
<td>4 hrs.</td>
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<td>Detailed study of enzymes including protein synthesis; primary, secondary, tertiary, and quaternary structure; nomenclature, physiological and catalytic function; enzyme kinetics, and metabolic regulations of enzyme activity. Prerequisite: BYS 542 or CH 561 or approval of instructor.</td>
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<tr>
<td>648</td>
<td>Enzymology Laboratory (UAH)</td>
<td>2 hrs.</td>
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<td>Techniques of isolation, purification, and characterization of enzymes. Prerequisite: BYS 647. Lab fee: Level 5.</td>
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<tr>
<td>651</td>
<td>Medical Entomology (UAH)</td>
<td>4 hrs.</td>
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<td></td>
<td>Insects and other arthropods as parasites and disseminators of disease. Mechanism of life cycles, biology, and control of insect parasites of man. Lab fee: Level 3. Prerequisites: BYS 361 and 455 or approval of instructor.</td>
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<td>Economic thresholds, economic injury levels, population dynamics, residues in food crops, chemical control, insect transmission of plant diseases, and livestock. Prerequisite: general entomology.</td>
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<tr>
<td>653</td>
<td>Taxonomy of the Immature Insect (UAH and A&amp;MU)</td>
<td>4 hrs.</td>
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<td>Studies of the literature, comparative morphology and techniques of identification of immature stages of the insect, methods of collecting and preserving the immatures. Lab Fee: Level 3. Prerequisite: BYS 455 or approval of instructor.</td>
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<tr>
<td>660</td>
<td>Ecosystem Dynamics (UAH)</td>
<td>4 hrs.</td>
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<td>An analytical approach (including simulation and modeling) to the interactions of organisms in terrestrial, aquatic, and marine ecosystems. One 4-hour lab a week. Lab fee: Level 3. Field trips required. Prerequisites: BYS 564 and 562.</td>
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<tr>
<td>661</td>
<td>Advanced Population Ecology (UAH)</td>
<td>4 hrs.</td>
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<td></td>
<td>Interaction of population structure, genetic properties, and ecology factors in controlling dynamics and evolutionary character of natural population. One 4-hour lab a week. Lab fee: Level 3. Prerequisites: BYS 312, BYS 564 or 565, or approval of instructor.</td>
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<tr>
<td>672</td>
<td>Advanced Systematic Botany (A&amp;MU)</td>
<td>4 hrs.</td>
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<td>Classification, nomenclature, and taxonomic theory of vascular plants. Prerequisite: plant taxonomy.</td>
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<td>Course Code</td>
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<tr>
<td>690</td>
<td>Seminar (UAH and A&amp;MU)</td>
<td>1 hr.</td>
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<td>Student reports on current journal articles. Graduate students should attend whether enrolled for credit or not.</td>
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<tr>
<td>691</td>
<td>Special Topics (UAH and A&amp;MU)</td>
<td>1-4 hrs.</td>
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<td></td>
<td>Literature search relative to topics of interest under supervision of instructor. For graduate students.</td>
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<tr>
<td>692</td>
<td>Research (UAH and A&amp;MU)</td>
<td>2-4 hrs.</td>
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<td></td>
<td>Individual investigations on graduate level of biological problems under supervision of graduate faculty member. A special problem may be carried out at Marine Environmental Sciences Consortium, Dauphin Island, Alabama. Available to thesis students. Lab Fee: Level 2 for 2 hours; Level 3 for 3 hours; Level 4 for 5 hours.</td>
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</tr>
<tr>
<td>699</td>
<td>Master's Thesis (UAH and A&amp;MU)</td>
<td>1-4 hrs.</td>
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<td>Requirement each term student is working and receiving direction on master's thesis. Minimum of two terms required for MS students. Maximum of 9 hours credit upon successful completion of master's thesis.</td>
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**Marine Sciences (MS)**

Courses are offered only at the Marine Environmental Sciences Consortium Sea Lab at Dauphin Island, Alabama.

Courses that can be included in a biological sciences major or minor:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>304</td>
<td>Coastal Zone Management</td>
<td>2 hrs.</td>
</tr>
<tr>
<td></td>
<td>Examination of ecological features and physical management policies design for coastal communities and a review of the Federal and State programs that impinge upon coastal ecological communities.</td>
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</tr>
<tr>
<td>502</td>
<td>Marine Botany</td>
<td>4 hrs.</td>
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<tr>
<td>503</td>
<td>Marine Invertebrate Zoology I</td>
<td>4 hrs.</td>
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<tr>
<td></td>
<td>Local examples of principal groups of marine invertebrates. Reproduction, distribution, taxonomy, systematics, and ecology. Lecture, laboratory, and field work. Opportunity to acquire collection of local fauna. Prerequisite: general biology.</td>
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</tr>
<tr>
<td>504</td>
<td>Marine Invertebrate Zoology II</td>
<td>4 hrs.</td>
</tr>
<tr>
<td></td>
<td>Study of select marine invertebrate phyla. Origins, relationships, comparative anatomy, embryology, and physiology. Prerequisite: invertebrate zoology.</td>
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</tr>
<tr>
<td>505</td>
<td>Marine Vertebrate Zoology</td>
<td>4 hrs.</td>
</tr>
<tr>
<td>506</td>
<td>Marine Zoogeography</td>
<td>4 hrs.</td>
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<td></td>
<td>Physical, chemical, and biological factors influencing distribution of marine organisms. Importance of continents, open oceans, and species competition on animal distribution. Zoogeographical patterns in Gulf of Mexico, western North Atlantic, and Caribbean regions. Prerequisite: 12 semester hours of biological sciences.</td>
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</tr>
<tr>
<td>507</td>
<td>Physiology of Marine Animals</td>
<td>4 hrs.</td>
</tr>
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<td></td>
<td>Environmental adaptations of marine animals. Biochemical, osmotic, respiratory, and temperature responses of both invertebrates and fish. Prerequisite: 12 hours in biological sciences. Biochemistry recommended.</td>
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</tbody>
</table>

509 Marine Ecology 4 hrs. Bioenergetics, community structure, population dynamics, predation, competition, and specialization in marine ecosystems. Lecture, laboratory, and field work. Students admitted without previous marine courses. For engineers and other nonbiologists interested in marine environment. Individual species as they relate to ecological principles exemplifying taxonomic and ecologic backgrounds. Prerequisites: introductory ecology. Chemistry and physics recommended; marine invertebrate zoology or marine biology helpful.

510 Marsh Ecology 4 hrs. Basic understanding of ecology of salt marsh. Habitat analysis, natural history studies, and population dynamics of selected vertebrates. Specific field problem terminated by a technical paper assigned to each student. For advanced undergraduates and graduate students. Prerequisite: introductory ecology.

511 Benthic Community Structure 4 hrs. Patterns of benthic macroinvertebrate abundance and distribution along Alabama coastline. Field sampling, taxonomy, and data analysis in lectures and labs. Major taxa such as polychaetes and crustaceans. Prerequisite: invertebrate zoology.


515 Coastal Ornithology 4 hrs. Coastal and pelagic birds with emphasis on ecology, taxonomy, and distribution. Food habits, field identification, and population dynamics. Prerequisite: introductory zoology.

517 Marine Technical Methods III 2 hrs. Advances laboratory instrumentation and techniques; individual projects with one of the following: Liquid scintillation counting, electrophoresis, atomic absorption spectrophotometry, UV-visible spectrophotometry or fluorometry or other techniques. Prerequisites: science major; permission of instructor.

590 Seminar 1 hr. Current research, scientific progress, and problems in marine environment. Participation by students, faculty, and visiting scientists. Students are not required to enroll in seminar, but must attend to qualify for credit in any other course.

599 Research on Special Topics 1-4 hrs. Enrollment by special arrangement in any subjects listed. Prerequisite: Arrangements with and approval of project supervisor and liaison officer. Students should note which term to take special topics in a particular subject. Only Marine Science Program resident faculty are available for special topics both terms. Other instructors available only time listed for their courses.

610 Marine Systems Ecology 4 hrs. The study of holistic characteristics, structure, function and performance of marine and estuarine ecological systems including interactions with human systems. Prerequisites: graduate standing; knowledge of BASIC or FORTRAN computer language.
The following courses cannot be taken for credit toward biological sciences major or minor but can be used for a marine science minor.

201 Ocean Science 4 hrs.  
Marine environment; full perspective of major features of oceanic realm and relation of oceans to man. Lecture, laboratory, and field work.

202 Marine Biology 4 hrs.  
Survey of invertebrates, vertebrates, and marine plants as communities with local examples of groups. Examination of marshland, estuarine, beach, dune inlet and neritic habitats, and niches. Lectures, laboratory, and field work. Prerequisite: general biology.

203 Natural History of Commercial Invertebrates 3 hrs.  
Basic understanding of behavior, physiology, development and ecology of commercially important invertebrates. Some previous biology recommended. Labs, field trips, and lecture material. For nonmajors.

204 Commercial Marine Fisheries of Alabama 2 hrs.  
Biology, harvesting technology, and processing of commercially valuable fish and shellfish species of Alabama.

205 Introduction to the Coastal Marine Environment 2 hrs.  
Biological, chemical, and climatological features peculiar to coastal areas of Alabama.

301 Marine Technical Methods I 2 hrs.  
Research equipment, methods, and techniques in marine science. Training in operation and field maintenance of major pieces of sampling gear. Prerequisite: introductory biology, chemistry, or physics.

302 Marine Technical Methods II 2 hrs.  
Equipment and techniques in laboratory analysis of water and other marine samples. Emphasis on water quality parameters. Prerequisite: introductory biology, chemistry, or physics.

303 Coastal Climatology 2 hrs.  
Physical factors that result in climatic conditions in and near coastal region. Emphasis on northern Gulf of Mexico.

500 Environmental Science for High School Teachers 4 hrs.  
Principles of ecology, techniques of laboratory and field studies, sources and control measures of pollution. Open to upper-level undergraduate and graduate students preparing to teach.

501 Introduction to Oceanography 4 hrs.  
Physics, chemistry, biology, and geology of oceans. For graduate students and those preparing for graduate school or intending to enter marine sciences professionally. Prerequisites: college algebra, general physics, and general chemistry.

514 Estuarine Science 4 hrs.  
Physical, chemical, and biological parameters of estuarine ecosystems. Field experience and lecture material. Mobile Bay in detail. Prerequisite: introductory zoology, chemistry, physics, or geology.

516 Scientific Data Management 2 hrs.  
Key techniques and principles in evaluating and expressing experimental data. Mapping, profiling, contouring, applied statistics, and graphical and tabular representation of results. Not a substitute for basic statistics courses.

520 Marine Geology 4 hrs.  
Sampling techniques, laboratory analysis of sediments, application of research process to problems in identifying sedimentary environments, topography, sediments, and
History of world oceans. Beneficial for understanding sedimentary substrate on or in which a large percentage of marine organisms live. Lecture, laboratory, and field work. Prerequisite: physical geology.

521 Recent Marine Sedimentation 4 hrs.
Investigations in properties of marine sediments, coastal sedimentary environments, continental margin sediments, reef and associated sediments, deep-sea sediments and marine geophysics. Erosional and depositional effects of waves and currents. Prerequisite: marine geology or oceanography.

522 Marine Paleocology 4 hrs.
Principal marine fossil groups in Gulf Coastal Plain sediments, their paleoecology, and paleogeography. Recent and ancient marine communities and individuals in them. Prerequisite: marine geology or advanced geology.

601 Oceanology of Gulf of Mexico 4 hrs.
Oceanology of Gulf of Mexico and adjacent waters. Coastal zone, continental shelf, and deep ocean. Prerequisite: graduate standing.
Chemistry Department

Professors Arendale, Baird (chairman), Harris, McManus, Riley; Associate Professors Coble, Emerson; Loo (Von Braun Fellow); Associate Research Professor Gregory; Adjunct Associate Professor Young; Assistant Professor Meehan.

Undergraduate Programs

The University of Alabama in Huntsville is on the American Chemical Society’s list of approved schools as a result of its strong faculty and excellent facilities for high quality undergraduate instruction.

Requirements for a Chemistry Major

1. Satisfactory completion of the university’s 55 to 61 hours GER, which include MA 153, 154, 233, PH 111, 112, plus 2 to 3 hours of physics in consultation with chemistry faculty adviser, and CH 121, 123, 125, and 126.

2. Completion of one of six approved AOC curricula below (or a different one, appropriately approved) each of which includes 21 semester hours of CH 223, 331, 332, 333, 335, 336, 341, 342, 343, and 345.

3. Completion of a number of electives, which vary depending on particular curriculum chosen. German or Russian is recommended for the language requirement.

The 27 to 28 hours of science and mathematics included in Requirement No. 1 satisfy science and mathematics GER for the B.S. degree.

Credit hours and letter grades are obtained for Chemistry 121, 123, 125, and 126 by making a satisfactory score on the CLEP examination. This examination is offered at various times during the year through the Office of Testing Services. Students pursuing credit by examination should consult the Chemistry Department before taking the examination.

The Chemistry Department offers courses leading to a B.S. degree with a chemistry major and supports undergraduate programs of other disciplines. A minimum of 9 semester hours must be completed at UAH in chemistry courses numbered 300 or above. All other grade and general requirements are equivalent to those established by UAH for degree programs.

No AOC credit is granted to chemistry majors for CH 101 or any mathematics course numbered lower than MA 153. A student requiring these courses must understand that total semester hours of course work taken as undergraduate may exceed the 128-semester-hour guideline for a baccalaureate program.

Unless attention is given to sequence in which courses are scheduled, chemistry majors may experience difficulty in getting required courses within a four-year period. Students should plan to take CH 223, 333, and PH 201 or 113 before fall term of their junior year.

Six approved curricula that emphasize chemistry as the major in an area of concentration (AOC) are shown below. The student is allowed considerable flexibility in planning his program, but all course patterns that differ from those listed require faculty approval. The six approved programs include the following general requirements and options listed under the six curricula headings.
Curriculum I Premedical Program
The premedical program conforms to requirements of most medical schools and contains sufficient chemistry to meet requirements of a chemistry major. Prospective medical students should explore their areas of interest outside of the sciences and strive for maximum scholastic achievement. Students should consult with the Preprofessional Advisory Committee early in their college program and prepare to take the Medical College Aptitude Test during the spring of their junior year. (An alternative premedical curriculum is included in Biological Sciences section.)

Curriculum II
B.S. degree with major in chemistry. This plan meets requirements for an Alabama Class B High School Teachers Certificate.

Curriculum III Graduate Preparatory Program
ACS Approved Program. This curriculum is approved by the American Chemical Society's Committee on Professional Training. It is for a student who plans to do graduate work or desires an industrial position that requires a strong chemical background. German is the recommended language for this program.
Semester Hours

Chemistry—CH 337, 346, 401, 421, elective and a senior project ........................................... 16
Mathematics—MA 244, 251, 352 .......................................................... 9
Mathematics or physics elective ................................................................................ 3
Electives ................................................................. 15-22

**Curriculum IV**

General education curriculum with a chemistry major. Deficiencies may exist with respect to graduate school entrance requirements.

Semester Hours

Chemistry—CH 337, 346, 401, one elective, and a senior project ...................................................... 12
Mathematics—MA 244, 251 .................................................................................. 6
Science electives .................................................................................... 8-9
Electives ......................................................................................... 16-24

**Curriculum V**

Chemistry-physics program appropriate for pregraduate education.

Semester Hours

Chemistry—CH 337, 346, 401, 421, and a senior project ................................................................. 12
Physics—PH 241, 331, 351, one laboratory from 310-312, and one elective ..................................... 13
Mathematics—MA 244, 251, 352, and one elective ......................................................................... 12
Electives ......................................................................................... 6-13

**Curriculum VI**

Typical chemistry-biological sciences program appropriate for pregraduate education in biochemistry or for students interested in clinical chemistry.

In addition to providing sound pregraduate school training for biochemists, this program exceeds the minimum requirements of the American Association of Clinical Chemistry. Thus a person who completes one year of acceptable experience in clinical chemistry subsequent to the B.S. degree may apply for certification as a clinical chemical technologist. Further successful experience may lead to certification as a clinical chemist.

Semester Hours

Chemistry—CH 337, 346, 361, 362, 421, and a senior project ................................................................. 14
Biological sciences—BYS 113, 114, 221, and two electives ............................................................... 21
Mathematics—MA 244 ........................................................................................................ 3
Electives ......................................................................................... 5-12

Minors—Typical chemistry minors that include 6 hours number 300 or above include following courses:

1. CH 121, 125, 123, 126, 223, 331, 332, 333, 335, 336 for premedical and predental students.
2. CH 121, 125, 123, 126, 223, 331, 332, 335, 361, 362 for some biology and medical technology majors.
3. CH 121, 125, 123, 126, 331, 332, 335, 341, 342, 343 for physics and mathematics majors.
Graduate Program

A Master of Science degree with a major in chemistry is offered. Additional courses are available. The doctoral degree is awarded through a cooperative affiliated program involving UAH and either the University of Alabama in Tuscaloosa or the University of Alabama in Birmingham.

Graduate courses are conducted at a level that assumes the student has a B.S. degree in chemistry as recommended by the American Chemical Society (see Curriculum III). Graduation from an undergraduate program not equivalent to ACS standards does not preclude entrance into the UAH program. The student should realize, however, that if deficiencies exist, time required to obtain the M.S. degree is correspondingly increased (see Graduate Programs).

M.S. Degree Requirements

General requirements of the School of Mathematical and Natural Sciences and the Graduate School under Plan 1 and Plan 2 must be satisfied.

A particular program must be planned in consultation with a member of the chemistry faculty assigned by the department chairman as a temporary adviser. When a student following Plan 1 selects his thesis topic, a supervisory committee will be appointed.

Plan 1 — This plan requires 24 semester hours of graduate course work, a thesis, and two units of seminar and reading competence in German or Russian. Faculty may accept other languages under special circumstances. Demonstration of computer machine language or B grades in CS 113 and 208 may also be substituted.

Plan 2 — Degree requirements for the master's degree under this plan include 33 or more semester hours of course work. Of the 33 hours, at least 21 of course work must be in chemistry and up to 12 hours may be in other graduate courses. At least one-half the course work in chemistry and one-half of the other course work must be 600-700 level. If the program contains three or more terms of full-time work, the degree requirements may be met with 30 or more semester hours, 18 of which must be in chemistry. A thesis is not required, and a foreign language proficiency is not necessary. A particular program must be planned in consultation with a member of the chemistry faculty assigned by the department chairman as a temporary adviser.

All other general and grade requirements are identical with those discussed in the School of Graduate Studies section.

Cooperative Ph.D. Degree Requirements

The Ph.D. requirements of the School of Graduate Studies and Chemistry Department of UAT or UAB must be fulfilled. Consult respective graduate catalogs. The following considerations are made for UAH cooperative students:

1. Only nine months of residency are required in Tuscaloosa or Birmingham.
2. Cumulative examinations may be taken at UAH.
3. Research may be done at UAH.
4. One or two UAH chemistry faculty members may serve on the dissertation committee.
# Chemistry (CH)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Introduction to Chemistry</td>
<td>3 hrs.</td>
<td>Properties of solids, liquids, gases, and solutions, atomic theory and bonding, concentration concepts, and physical and chemical properties of the more common elements and their compounds. CH 101 does not count in chemistry major or minor. Chemistry majors or minors taking CH 101 get elective credit only. CH 101 may be used with CH 105 and CH 113 to fulfill laboratory science requirement. No placement examination is required for enrollment in CH 101. Student may opt to take CH 101 even if satisfactory score on placement examination for enrollment in CH 121. Prerequisite: MA 104 or 105 or mathematics Level II placement. Parallel: CH 105.</td>
</tr>
<tr>
<td>105</td>
<td>Introductory Chemistry Laboratory</td>
<td>1 hr.</td>
<td>Laboratory fundamentals and basic chemical principles. A student enrolled in a B.S. degree program who plans to take CH 121 and CH 125 and has had chemistry laboratory experience may be exempt from CH 105 by permission of Chemistry Department chairman. CH 105 may not be counted in chemistry major or minor. Chemistry majors or minors receive only elective credit. Parallel: CH 101. Lab fee: Level 3.</td>
</tr>
<tr>
<td>113</td>
<td>Elementary Organic Chemistry</td>
<td>4 hrs.</td>
<td>Nomenclature, structure, functional groups, and properties of organic compounds. Recommended for nursing majors, some biology minors, and as a sequence to CH 101 and 105 for an 8-hour laboratory science requirement for nonscience majors. Not open to chemistry majors and minors. Laboratory included. Lab fee: Level 3. Prerequisite: CH 101, 105; equivalent or placement examination.</td>
</tr>
<tr>
<td>121</td>
<td>General Chemistry</td>
<td>3 hrs.</td>
<td>For science and engineering majors. Principles concerned with gases, liquids, solids, and solutions. Nature of the chemical bond, kinetics, chemical equilibrium, electrochemistry, thermochemistry, chemical properties of elements, their periodic groups, and their compounds. Introduction to nuclear chemistry. Prerequisite: CH 101 or placement test and MA 104 or MA 105 or placement Level II mathematics; parallel: CH 125.</td>
</tr>
<tr>
<td>123</td>
<td>General Chemistry</td>
<td>3 hrs.</td>
<td>Continuation of 121 with in-depth study of topics listed. Prerequisite: CH 121. Parallel: CH 126.</td>
</tr>
<tr>
<td>125</td>
<td>General Chemistry Laboratory</td>
<td>1 hr.</td>
<td>Laboratory work complements the lecture material for CH 121. Parallel: CH 121. Lab fee: Level 3.</td>
</tr>
<tr>
<td>126</td>
<td>Qualitative Inorganic Analysis Laboratory</td>
<td>1 hr.</td>
<td>Chemical equilibrium to systematic separation and qualitative detection of elements. Application of chemical and physical properties of numerous metal and complex ions and compounds. Parallel: CH 123. Lab fee: Level 3.</td>
</tr>
<tr>
<td>223</td>
<td>Quantitative Analysis</td>
<td>4 hrs.</td>
<td>Background in fundamental quantitative analytical chemistry with an introduction to instrumentation. Data treatment, ionic equilibria, elementary electrochemical, spectrochemical, gravimetric, and volumetric techniques. Laboratory included. Lab fee: Level 4. Prerequisite: CH 126.</td>
</tr>
<tr>
<td>301</td>
<td>Elementary Biochemistry</td>
<td>3 hrs.</td>
<td>Biochemistry and energetics of living cells, metabolism, structure and function of carbohydrates, lipids, proteins and nucleic acid. Enzymes, coenzymes, vitamins, blood, endocrine glands, DNA synthesis and gene expression, nutrition, drugs and biochemistry of specialized tissues. Prerequisites: BYS 114 and CH 113 or 123. No credit given to chemistry majors or minors. Credit in CH 361 precludes credit in CH 301. (Same as BYS 301).</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
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<tr>
<td>331</td>
<td>Organic Chemistry</td>
<td>3 hrs.</td>
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<td></td>
<td>Chemistry of organic compounds. Synthetic methods, theory, and reaction mechanisms. Prerequisite: CH 123, 126; CH 223 recommended.</td>
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<tr>
<td>332</td>
<td>Organic Chemistry</td>
<td>2 hrs.</td>
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<tr>
<td></td>
<td>Continuation of CH 331. Prerequisite: CH 331.</td>
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<tr>
<td>333</td>
<td>Organic Chemistry</td>
<td>2 hrs.</td>
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<tr>
<td></td>
<td>Continuation of CH 332. Prerequisite: CH 332.</td>
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<tr>
<td>335</td>
<td>Organic Chemistry Laboratory I</td>
<td>1 hr.</td>
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<tr>
<td></td>
<td>Techniques of organic chemistry including synthesis, separation, and identification of organic compounds with use of chemical and spectroscopic methods. Lab fee: Level 4. Prerequisite or parallel: CH 331.</td>
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<tr>
<td>336</td>
<td>Organic Chemistry Laboratory II</td>
<td>1 hr.</td>
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<tr>
<td></td>
<td>Continuation of CH 335. Lab fee: Level 4. Prerequisite: CH 335. Prerequisite or parallel: CH 332.</td>
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<tr>
<td>337</td>
<td>Organic Chemistry Laboratory III</td>
<td>2 hrs.</td>
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<tr>
<td></td>
<td>Advanced organic chemistry laboratory treating reactions and techniques not covered in CH 335 and 336. Pursuit of special open-ended problem by each student. Lab fee: Level 4. Prerequisite: CH 336 and approval of instructor.</td>
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<tr>
<td>341</td>
<td>Chemical Thermodynamics</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Theory of classical thermodynamics and its application to chemistry of solids, liquids, gases, and solutions. Prerequisite: CH 223, PH 111. Prerequisite or parallel: MA 233, PH 112.</td>
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<tr>
<td>342</td>
<td>Chemical Dynamics</td>
<td>2 hrs.</td>
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<tr>
<td></td>
<td>Discuss kinetic theory of gases, theory and formulation of rate equations, mechanisms of chemical reactions, and applications. Prerequisite: CH 343.</td>
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<tr>
<td>343</td>
<td>Introduction to Quantum Chemistry</td>
<td>2 hrs.</td>
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<tr>
<td></td>
<td>Quantum mechanical treatment of chemical bond. Structure, symmetry, spectroscopy, and statistical thermodynamics. Prerequisite: CH 341, MA 244, or permission of the instructor.</td>
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<tr>
<td>345</td>
<td>Experimental Physical Chemistry I</td>
<td>1 hr.</td>
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<td></td>
<td>Laboratory investigations into thermodynamics. Lab fee: Level 4. Prerequisite: CH 223 and 341.</td>
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</tr>
<tr>
<td>346</td>
<td>Experimental Physical Chemistry II</td>
<td>1 hr.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Laboratory investigations into kinetics and spectroscopy. Lab fee: Level 4. Prerequisite: CH 345. Parallel: CH 342.</td>
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<tr>
<td>361</td>
<td>General Biochemistry</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Detailed study of molecules that comprise living systems. Their nomenclature, structure, properties, and functions in metabolism. Enzymatic properties and function; major and minor biosynthetic and catabolic pathways, their interrelations and control mechanism. Glycolysis and gluconeogenesis, Kreb's cycle, photosynthesis, lipids, amino acids and protein, and nucleic acids. Prerequisites: BYS 114, CH 332, and CH 335. (Same as BYS 361).</td>
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<tr>
<td>362</td>
<td>General Biochemistry Laboratory</td>
<td>1 hr.</td>
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<td></td>
<td>Practical experience in isolation, qualitative identification, and quantitative estimation of biomolecules. One 4-hour lab a week. Lab fee: Level 4. Prerequisite or parallel: CH 361. (Same as BYS 362).</td>
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</table>
401 Inorganic Chemistry 3 hrs.
Fundamental topics in inorganic chemistry. Atomic structure, chemical bonding, periodic relationships, acid-base theories, nonaqueous solvents, and reaction mechanisms. Prerequisite or parallel: CH 342.

421 Instrumental Analysis 4 hrs.
Introduction to modern analytical instrumentation including IR, UV and atomic absorption spectrophotometers, nuclear magnetic spectrometer, electroanalytical equipment, and gas and liquid chromatographs. Lecture and laboratory. Lab fee: Level 4. Prerequisite: CH 346.

480 Selected Topics in Chemistry 1-3 hrs.
Special offerings to students in areas of interest not covered in present curriculum. Prerequisite: senior standing and approval of instructor.

491, 492, 493 Introduction to Chemical Research 1-3 hrs.
Personalized programs to round out undergraduate curriculum of students with various goals. Prerequisite or parallel: CH 345 and senior standing. Approval of supervising faculty member and chemistry chairman required. Registration utilized last digit of course number to designate semester-hour credit. Student normally may elect only up to 6 hours. Lab fee: Level 3 for CH 492, level 4 for CH 493. No fee for CH 491.

521 Chemical Instrumentation 4 hrs.
Use of basic instrumentation in electrochemical, chromatographic, and spectrophotometric analysis. Laboratory work emphasis in general utility of operational amplifiers in making chemical measurements and introduction to digital logic. Lab fee: Level 4. Prerequisite: CH 346.

525 Environmental Chemistry 3 hrs.
Principles of quantitative analyses related to minor components of a sample. Applications selected from principal analyses necessary to maintain environmental quality of air, water, and soil. Selection of conditions for collecting reliable samples, concentration of components with techniques for increasing concentration of selected component, relationships between physical and chemical changes in sample and signal output of predominant transducers, and translation of chemical analysis into meaningful specifications. Lecture only. Prerequisite: CH 521 or 123; EG 311, 342.

531 Physical Organic Chemistry 3 hrs.
Introduction to theoretical organic chemistry. Bonding, methods for determining reaction mechanisms, reactive intermediates, and stereochemistry. Prerequisite: CH 333, 343, or approval of instructor.

540 High Polymer Chemistry 3 hrs.
Theory of polymer formation and structural dependence of polymer properties. Prerequisites: CH 337, 342.

549 Spectroscopy and Molecular Structure 3 hrs.
Intermediate level treatment of principles of spectroscopy and their application to determination of molecular structure. Prerequisite: CH 343.

553 Introductory Quantum Mechanics I 3 hrs.
Prerequisites: CH 343, PH 351, MA 244, 251, 352. (Same as PH 551).

554 Introductory Quantum Mechanics II 3 hrs.
Prerequisite: CH 553. (Same as PH 552).

560 X-Ray Structure Determination 4 hrs.
The course will examine both theoretical and practical aspects of molecular structure determination by x-ray diffraction methods. Topics include diffraction of x-rays, symmetry operations and space groups, methods of data collection, theory of structure factors and Fourier synthesis, least squares methods of structure refinement. Extensive laboratory and computer work included. Lab fee: Level 4. Prerequisites: senior standing in chemistry or physics and approval of the instructor.
561 Biochemistry I 3 hrs.
Structural chemistry and function of biomolecules, mechanisms of biochemical reactions, enzyme kinetics, and energy transfer. Prerequisite: CH 333 or CH 361. (Same as BYS 547).

562 Biochemistry II 3 hrs.
Metabolism, biosynthesis of macromolecular precursors, storage, transmission, and expression of genetic information, and molecular physiology. Prerequisite: CH 561. (Same as BYS 548).

565 Molecular Biochemistry Laboratory 2 hrs.
Practical experience in isolation and characterization of biomolecules. Lab fee: Level 4. Prerequisite: CH 562.

600 Advanced Inorganic Chemistry 3 hrs.
Survey with emphasis on structure and reactivity of inorganic compounds. Prerequisite: CH 401.

601 Structural Methods in Inorganic Chemistry 3 hrs.
Physical methods applied to determination of structure of inorganic compounds. Prerequisite: CH 600.

602 Chemistry of Coordination Compounds 3 hrs.
Modern bonding theory and stereochemistry of coordination compounds. Prerequisite: CH 600.

603 Chemistry of Nonmetal Compounds 3 hrs.
Chemistry of selected nonmetal compounds. Prerequisite: CH 601.

621 Methods of Chemical Analysis 3 hrs.
Literature, seminar course. Theory and methodology of various techniques of chemical analysis. Prerequisite: CH 521 or CH 421.

631 Advanced Organic Chemistry I 3 hrs.
Systematic study of reaction mechanism of various types of organic compounds. Prerequisite: CH 531.

632 Advanced Organic Chemistry II 3 hrs.
Complementary to previous courses. Special classes of compounds and natural products.

633 Synthetic Organic Chemistry 3 hrs.
Reactions and principles in synthesis of simple and complex organic compounds. Prerequisite: CH 632.

640 Advanced Chemical Thermodynamics 3 hrs.
First, second, and third laws of thermodynamics and applications. Brief introduction to statistical thermodynamics. Prerequisite: CH 343, MA 251, or approval of instructor.

641 Statistical Thermodynamics 3 hrs.
Principles leading to the development of Maxwell-Boltzmann, Bose-Einstein, and Ferm-Dirac statistics. Thermodynamic properties calculated from partition function. Prerequisite: CH 640.

642 Advanced Chemical Dynamics 3 hrs.
Velocity of chemical reactions in homogeneous and heterogeneous systems. Absolute rate theory, collision theory, scattering, and concept of reaction cross sections. Prerequisite: CH 640.

643 Quantum Chemistry 3 hrs.
Application of theory to chemical bond in spirit of Coulson and Murrell, Kettle, and Tedder. Prerequisite: CH 640.
661 Biological Macromolecules 3 hrs.
Detailed analysis of structures of proteins, nucleic acids, and complex polysaccharides.
Prerequisite: CH 562.

699 Master's Thesis 3 or 6 hrs.
Required each term a student is working and receiving direction on master's thesis.
Minimum of two terms required.

705 Selected Topics in Inorganic Chemistry 3 hrs.
Prerequisite: CH 600 and approval of instructor.

721 Selected Topics in Analytical Chemistry 3 hrs.
Prerequisite: CH 621 or equivalent and approval of instructor.

735 Selected Topics in Organic Chemistry 3 hrs.
Prerequisite: CH 633 and approval of instructor.

745 Selected Topics in Physical Chemistry 3 hrs.
Prerequisite: CH 643 and approval of instructor.

765 Selected Topics in Biochemistry 3 hrs.
Prerequisite: CH 661 and approval of instructor.

780 Chemistry Seminar 1 hr.
Minimum of two terms required of students working toward M.S. degree.

799 Doctoral Dissertation 3, 6, or 9 hrs.
Required each term student is working and receiving direction on doctoral dissertation.

Natural Science Program
The natural science sequence (12 semester hours) is an integrated science program specifically for liberal arts (nonscience) majors. Contemporary aspects of science are a framework for introducing basic scientific concepts in a manner more appropriate for nonscience students. Fundamental ideas of chemistry, physics, and biology are treated to minimize distinction among the three disciplines. Study is directed toward conveying the impact of science on the individual's life and teaching him to apply general, but sound, scientific logic to arrive at reasonable conclusions about scientific and technological questions. Stressed throughout the three terms are: (1) interaction of science with social, economic, and political forces, (2) strengths and limitations of science and technology, and (3) understanding of science as a human endeavor. The laboratory, which is necessary for any sound basic science program encourages students to be aware of modern-day problems and illustrates the need for careful experimental investigation of technical problems in the spirit of the scientific method.

The natural science sequence may be used to fulfill the university's general education requirements. It also satisfies the physical and biological science requirement for teacher certification. Maximum benefit is obtained when three terms are taken sequentially because of the integrated nature of the program. Courses, however, may be taken out of sequence and an individual course may be taken as an elective. The program is open to undergraduates at all levels.
Natural Science (NS)

111 Ecological Awareness (with laboratory)  4 hrs.
Scientific nomenclature, ecosystems, cycles, environmental problems, population and control, resource depletion, food production, nutrition and additives, social and political issues, and economics as related to ecological crisis. Lab fee: Level 3. Prerequisite: Level I placement in mathematics (one year of high school algebra).

112 Physical Science and Society (with laboratory)  4 hrs.
Atomic structure, simple nuclear reactions, atomic energy and its uses, fission, fusion, energy crisis, relativity, introductory astronomy and cosmology, geographic evolution, and evolution of man. Lab fee: Level 3. Prerequisite: Level I placement in mathematics.

113 Human Awareness (with laboratory)  4 hrs.
Basic concepts and their relationship to society in genetics and genetic engineering, aging, human sexuality, contraception, venereal disease and drugs. Lab fee: Level 3. Prerequisite: Level I placement in mathematics.
Computer Science Department
Associate Professors Hay, Hooper, Johannes, Shiva (chairman); Adjunct Associate Professor Davis; Assistant Professor Ranganath; Adjunct Assistant Professor Hodges; Instructors Cooper, Graves.

Undergraduate Program
The computer science faculty offers courses leading to the B.S. degree with a major in computer science. Courses are also available as a minor in computer science for students majoring in other areas, or for inclusion in a cognate study area.

A major in computer science must include CS 113, 208, 214, 308, 309, 311, 415, 424, 501, and 517 (basic core — 30 semester hours). Six additional hours at the 400 level or above, with at least three of these hours at the 500 level, must be selected to complete the major. A 27 semester hour minor in mathematics is also required.

Curriculum
B.S. degree with a major in Computer Science

<table>
<thead>
<tr>
<th>Component</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER (humanities, social sciences, foreign languages)</td>
<td>30-36</td>
</tr>
<tr>
<td>Basic Science</td>
<td></td>
</tr>
<tr>
<td>1. General Physics — PH 111, 112</td>
<td>8</td>
</tr>
<tr>
<td>2. Chemistry (CH 121, 123, 124, 126) or Biological Sciences (BYS 113, 114)</td>
<td>8</td>
</tr>
<tr>
<td>Computer Science Major Core — (CS 113, 208, 214, 308, 309, 311, 415, 424, 501, 517)</td>
<td>30</td>
</tr>
<tr>
<td>Computer Science Electives — (Must be preapproved by the student’s computer science adviser; must be at the 400 level or above and must include at least one 500 level course)</td>
<td>6</td>
</tr>
<tr>
<td>Mathematics Minor — (MA 153, 154, 233, 244, 251, 352, 385, 415, 440)</td>
<td>27</td>
</tr>
<tr>
<td>Electives (to bring total number of semester hours to 128)</td>
<td>13-19</td>
</tr>
<tr>
<td>Minimum of 12 hours of electives outside of computer science and mathematics.</td>
<td></td>
</tr>
</tbody>
</table>

A suggested schedule of courses for full-time students majoring in computer science is available from the department.

Undergraduate Minors
A minimum of 21 hours of course work is required for a minor in computer science. The requests for minor should be initiated by the department in which the student is majoring. Typical course sequences for a minor are listed below:

Business majors with a computer science minor — CS 113, 208, 214, 308, 311, 411, and one of the following: CS 501, 513, or 517.

Mathematics and science majors with a computer science minor — CS 113, 208, 214, 308, 309, 424 and one of the following: CS 501, 513, or 517.

Cognate Study Area must include CS 100, 211, 310, 411.

Graduate Programs
The computer science faculty offers courses for Master of Science degree under Plan I and Plan II, the Doctor of Philosophy degree, and a graduate...
minor in computer science for students in other areas. General information about the graduate program at UAH and general requirements for advanced degrees are given in the section on Graduate Studies. The department offers courses in the following broad areas: (1) foundations of computer science, (2) software systems, (3) artificial intelligence, and (4) computer architecture.

Graduate Minor
A graduate minor should include CS 501 and CS 517, 624 or 690.

Master of Science
The purpose of the M.S. degree program is to prepare students for advanced research work in computer science or to offer a terminal degree for those who wish to enter industry or government service.

Admission to the Program — Requirements for admission to the program conform to policies of the Graduate School. Prerequisites are (a) mathematics (MA 153, 154, 233, and 244 and three hours of logic abstract algebra (CS 214, MA 440, or equivalent) and (b) Computer Science (CS) 113, 208, 308, 309, and 501. Additional course work may be required to remove deficiencies in undergraduate studies. Students who do not meet requirements may be admitted on the recommendation of the Computer Science Department Chairman.

A minimum score of 500 on the quantitative portion of the aptitude test of the GRE is required for unconditional admission. The advanced portion of the GRE is not required.

Degree Requirements — The Master of Science degree is conferred on students who satisfy degree requirements of the Graduate School under Plan I or Plan II and the following:

1. Courses numbered between 513 and 599 may be taken for graduate credit with prior approval of student’s plan of study. The student must attain a minimum grade of B in all core courses and in each CS course numbered less than 600 to receive credit toward a master’s degree in computer science; otherwise, he must substitute another approved course.

2. A program of study must be planned in consultation with a member of the computer science faculty assigned by the department chairman as temporary adviser. When a student following Plan I selects his thesis topic, a supervisory committee will be appointed. A committee will be appointed just before the comprehensive examination for plan II students. The program of study is subject to approval by the chairman of the Computer Science Department, and the dean of the School of Graduate Studies.

Plan I. A minimum of 24 semester hours of course work and the writing of an acceptable thesis must be completed. Course work must include (a) 15 to 18 semester hours of graduate credit in core and major electives and (b) 6 to 9 hours of courses in approved minor area. Student must pass comprehensive final examination.

Plan II. A minimum of 33 semester hours must be completed and must include (a) 18 to 21 semester hours of graduate credit courses in core and major electives, (b) 12 to 15 semester hours of courses in approved minor area. Student must pass comprehensive final examination.

Core Courses — All students must take the following three courses: CS 517 Data Structures, CS 624 Programming Languages, and CS 690 Operating Systems.
Approved Minor Areas
Administrative science
Computer engineering
Control sciences
Ergonomics
Engineering management
Mathematics
Operations research
Statistics with applications
Other appropriate minors may be approved by the chairman of the Computer Science Department.

Doctor of Philosophy
A statement of procedures for admissions and administration of the Ph.D. program in computer science may be obtained from the Computer Science Department office.

Admission to the Ph.D. program in computer science is dependent upon the performance in the preliminary examination. Students entering UAH with an M.S. degree or previous graduate training are required to take the Preliminary Examination at their earliest opportunity.

Major Subject
A minimum of 60 hours of graduate course credit and 18 dissertation credit hours is required for the Ph.D. in computer science. Computer Science (CS) 513, 517, 530, 603, 617, 624, 690, and a minimum of 15 additional semester hours must be selected from a single area and at least 6 semester hours must be at 700 level.

Minor Subject
The candidate must also have a minor consisting of 24 semester hours outside of one of the four major areas which is chosen with the approval of the candidate’s advisory committee. A minimum of 9 semester hours of graduate level mathematics must be included in the minor.

In order to be admitted to candidacy for the Ph.D. degree a student must pass the qualifying examination. Prior to taking this examination the applicant must be considered to be adequately prepared in the major and minor fields by the advisory committee. Additionally, the following requirements must be satisfied: (a) completion of at least 18 semester hours of graduate course work in residence at UAH, (b) completion of the ancillary skill requirement as outlined by the School of Graduate Studies. The qualifying examination may be taken no more than twice and is designed to test the student’s fitness for pursuing a research project in his chosen area and to test his general knowledge of computer science.

A significant portion of the dissertation must be submitted for publication in an approved journal with international circulation.

Computer Science (CS)

100 Introduction to Computers and Programming 3 hrs.
113 Computer Programming 3 hrs.
Basic components of algorithms such as assignment, conditional branching, and input/output. Basic algorithmic processes such as sorting, searching, table look-up, and interactive procedures. Representation of algorithms in form of flow charts and computer programs, components and basic capabilities of computer systems, programming language FORTRAN, and computer experience in use of this language in solution of both numerical and nonnumerical problems. Definition and use of functions and subroutines. Lab fee: Level 3. Prerequisites: MA 121 or Level III mathematics placement and CS 100 or equivalent.

201 Introduction to Computers and Information Systems 3 hrs.
Evolution of digital computers. Overall structure of computer problem solving and method of constructing computer solutions. Overview of hardware/software systems. Data and information processing in organizations and other computer uses in management. Management of the computer as a resource. Impact of computers on the individual and society, including security, privacy, and control. Programming in the BASIC language and the use of computer terminals. Applications and examples will generally be from administrative areas. Lab fee: Level 3. Prerequisite: MA 121 or MA 143 or Level III placement. Same as MIS 201.

208 Computer Organization and Advanced Programming I 3 hrs.
Introduction to the programming language PASCAL; experience in PASCAL use for problem solution, with emphasis on structured programming techniques. Computer hardware organization; representation of numbers and characters, memory and memory-addressing techniques. Functions of central processing and control units, instruction representation and execution. Introduction to a representative computer and assembly language. Lab fee: Level 3. Prerequisite: CS 113.

211 Introduction to Computers in Business 3 hrs.
Information processing and computer fundamentals; computer systems, programming planning, and introductory COBOL programming. Table handling and hierarchical data structure. Lab fee: Level 3. Prerequisite: CS 201 or CS 113.

214 Introduction to Discrete Structures 3 hrs.
Review of set algebra including mappings and relations. Algebraic structures including semigroups and groups. Elements of theory of directed and undirected graphs; Boolean algebra and propositional logic and applications of these structures to various areas of computer science. Lab fee: Level 3. Prerequisite: CS 113.

308 Computer Organization and Advanced Programming II 3 hrs.
Computer software systems: loaders, assemblers, compilers, interpreters, operating systems; programming concepts including subroutines, recursive and reentrant code, and macros. Functional description of input/output and mass storage devices, and software for controlling and using such devices. Structure and operation of assemblers; emphasis on programming experience with a representative assembler. Summaries of architectures of several computers, including the University computer; review of the University computer's assembly language. Lab fee: Level 3. Prerequisite: CS 208.

309 Switching Theory 3 hrs.
Techniques for analysis and design of combinational and sequential switching networks; Boolean algebra, elements of coding theory. Minimum complexity combinational networks, threshold logic, functional decomposition, minimum complexity sequential, and asynchronous sequential networks. Prerequisites: junior standing and CS 113. Lab fee: Level 3.

310 Introduction to Business Data Processing 3 hrs.
Overview of COBOL, advanced COBOL features, control language and file handling (sequential random and indexed sequential), management of computers, documentation, and maintenance. Design and implementation of computer based information systems. Lab fee: Level 3. Prerequisite: CS 211, not open to students who have had CS 311.
311 Computer Applications in Economics and Business I
3 hrs.
Business systems and data-processing procedures and impact of data-processing methods on economic structure of business. User communications, file design, report control, documentation. Data bases, information collection, planning and control, and systems design concepts. COBOL. Lab fee: Level 3. Prerequisite: CS 208, Not open to students who have had CS 211 or CS 310, same as MIS 311.

411 Computer Applications in Economics and Business II
3 hrs.
Techniques in economic business modeling, case studies of business applications and computer simulation of business operations. Projects requiring independent research. Lab fee: Level 3. Prerequisite: CS 311 or 310; same as MIS 411.

415 Introduction to Digital Computer Design
3 hrs.
Logic and electronic design of functional digital units, design of computer subsystems, flow of information, and logical flow diagrams in timing and control. Design of memory, arithmetic, and I/O units, binary and decimal machine arithmetic, and design of digital computer. Lab fee: Level 3. Prerequisite: CS 309 or permission of instructor.

424 Introduction to Programming Languages
3 hrs.
Data and control structures and run-time considerations for modern programming languages such as PASCAL, ALGOL, PL/1, and SNOBOL. Their applications in areas illustrating typical usage and characteristics. Lab fee: Level 3. Prerequisite: CS 308 or approval of instructor.

501 Systems Software
3 hrs.
Principles of systems programming; language translators, assemblers, interpreters, and compilers. Operating systems concepts: monitors, scheduling, memory management, and process management. Lab fee: Level 3. Prerequisite: CS 424 or permission of instructor.

513 Computer Architecture
3 hrs.
Review of combinational and sequential logic design, register transfer concept, logic design of memory, arithmetic unit, control unit, and I/O system of simple computer. Architectural trade-offs; representative computer architectures including a micro-, mini-, and large-scale computer system. Lab fee: Level 4. Prerequisite: CS 308, CS 309; not open to students who have had CS 415.

517 Data Structures
3 hrs.
Basic concept of data. Linear lists, sublists, strings, arrays, queues, stacks, trees and graphs. Storage systems and structures and storage allocation and collection. Efficient algorithms for creating, sorting, merging, searching structured data. Formal specification of data structures, data structures in programming languages, and generalized data-management systems. Lab fee: Level 3. Prerequisite: CS 501 or approval of instructor.

530 Artificial Intelligence
3 hrs.
Basic methodologies and techniques; heuristic search, modeling and representation of knowledge, deduction and problem solving, languages and system. Some application areas: automatic programming, robots, machine vision, natural language systems, automatic-theorem proving, game playing, and information-processing psychology. Lab fee: Level 3. Prerequisite: CS 517 or approval of instructor.

586 Microprocessor Architecture
3 hrs.
History of microprocessors and typical applications; architecture: four, eight, and sixteen bit processors, register and bus structures, I/O and interrupt structures; memories: RAM, and ROM. Instruction sets, addressing modes, stacks, interfacing fundamentals; programming and interfacing projects. Lab fee: Level 3. Prerequisite CS 415 or 513.

603 Formal Languages and Mathematical Machine Theory
3 hrs.
Formal definition of programming languages including specification of syntax and semantics. Definition of formal grammars finite-state and context-free and context-
sensitive grammars. Definition of mathematical machines finite-state, pushdown, linear-bounded automata. Relationship between formal languages and automata. Lab fee: Level 3. Prerequisite: CS 214 and 624 or approval of instructor.

612 Compiler Construction and Writing Systems

3 hrs.
Review of programming language structures, translation, loading, execution, and storage allocation. Compilation of expressions and statements; organization of a compiler including compile-time and run-time symbol tables, lexical analysis, syntax analysis, object-code generation and error diagnostics. Compiler tools system. Lab fee: Level 3. Prerequisite: CS 624.

613 Advanced Computer Architecture

3 hrs.
Associative, parallel, and pipeline architectures; multiple processor systems, and concepts of high-order language architectures. Computer networks, performance evaluation, selected architectures including micro-, mini-, and large-scale computer systems. Lab Fee: Level 3. Prerequisite: CS 513 or equivalent.

617 Design and Analysis of Algorithms

3 hrs.
Strategies of algorithm synthesis and analysis. Design methodologies of classical algorithm categories such as: divide-and-conquer, greedy method, dynamic programming, search and traversal, back-tracking, and branch-and-bound. Computational complexity and important theoretical results from lower- and upper-bound studies, NP-hard and NP-complete problems. Lab fee: Level 3. Prerequisite: CS 517.

624 Programming Languages

3 hrs.
Definition and classification of programming languages. Concepts, designs, and use of languages, such as block-structured, string-processing, and list-processing languages. Unified approach to general-purpose languages, comparative analysis of languages, and design of a specific language. Recent developments; syntax, and semantics. Lab fee: Level 3. Prerequisite: CS 517 or equivalent.

640 Automatic Pattern Recognition

3 hrs.
Discriminant analysis, maximum likelihood decisions, deterministic and non-deterministic approaches for trainable classifiers, preprocessing and feature extraction, clustering, syntactic pattern recognition. Pattern recognition in image analysis. Lab fee: Level 3. Prerequisites: MA 244, 385.

645 Interactive Computer Graphics

3 hrs.
Interaction graphics application program fundamentals. User friendly interactive dialogue design, hardware and software concepts-windowing, clipping, and logical interaction handling; data structures and geometric transformation useful for modeling objects especially in hierarchical form; device independent algorithms as well as shading, texturing and models for representing color in realistic synthetic photographs. Evolution of display processor architecture with respect to functional distribution. Lab fee: Level 4. Prerequisites: CS 624, 640.

650 Software Engineering

3 hrs.
Life-cycle stages of any software, such as requirements, design, implementation, testing, maintenance, and management issues. Methodologies in software engineering. Projects to illustrate software engineering advancements. Lab fee: Level 3. Prerequisite: CS 624.

686 Microcomputer Systems

3 hrs.
Systems study including standard peripheral interfacing, analog interfacing, design, development and implementation of firmware, bi-polar slice sequence control, high speed fixed and floating point arithmetic units. Cross assemblers, loaders, and large machine interfacing. One or more system design projects using extant devices in the micro-computing laboratory. Lab fee: Level 4. Prerequisite: CS 586 or equivalent.

687 Data Base Systems

3 hrs.
Basic concepts of data base systems. Relational data bases, normal forms of relation data bases; relational calculus and relational algebra, data sublanguages. Hierarchical

690 Operating Systems 3 hrs.
Techniques of constructing operating system control programs including management of system, jobs, and data; multiprogramming, multiprocessing, and timesharing systems. Lab fee: Level 3. Prerequisite: CS 517.

695-698 Selected Topics in Computer Science 3 hrs.
Courses in special topics requested by students. Prerequisites: approval of instructor.

699 Master's Thesis
Required each term student is working and receiving direction on master's thesis. Minimum of two terms is required. Maximum of 9 hours of credit upon successful completion of master's thesis.

703 Theory of Programming Languages 3 hrs.
Syntactic analysis and semantic interpretation of programming languages based on research and results in formal languages and associated compiler techniques as in procedure-oriented compilers. Identification of research directions and potential research projects in programming languages. Lab fee: Level 3. Prerequisite: CS 603.

713 Distributed Processing Systems 3 hrs.
Computer network configurations, communication protocols, and architectural trade-offs; distributed data bases; operating systems and software issues. Reconfiguration, recovery, and reliability; specification and design of distributed systems; case studies. Prerequisites: CS 613 and 690.

730 Advanced Artificial Intelligence and Heuristic Programming 3 hrs.
Definition of heuristic versus algorithmic methods, rationale of heuristic approach, description of cognitive processes, and approaches to mathematical induction. Heuristic programming techniques including use of list-processing languages. Class and individual projects to illustrate concepts. Lab fee: Level 3. Prerequisites: CS 530 and 624.

735 Computer Vision 3 hrs.
The construction of explicit, meaningful descriptions of physical objects from images. Generalized and segmented images and image-like entities, geometric structures expressed as quantitative models of images. Relational structures using knowledge bases and symbolic descriptions and understanding via matching, inference and goal achievement. Lab fee: Level 4. Prerequisites: CS 530, CS 640.

750 Advanced Software Engineering 3 hrs.
Experimental framework of Software Engineering. Design of experiments to evaluate different methods and techniques in software development, operation, and maintenance. Several student-designed software engineering experiments as course projects. Lab fee: Level 3. Prerequisite: CS 650.

790 Advanced Operating Systems 3 hrs.
Time-sharing and distribution queuing models, models of program behavior, concurrency, multilevel memory allocation and paging, algorithms, analysis of file structures and I/O scheduling. Measurement techniques and analysis. Lab fee: Level 4. Prerequisite: CS 690.

795-798 Advanced Selected Topics 3 hrs.
Courses in special topics requested by students. Prerequisite: approval of instructor.

799 Doctoral Dissertation
Required each term student is working and receiving direction on doctoral dissertation. Maximum of 15 hours credit.
Environmental Science Program
Professors Rand; Adjunct Professor Essenwanger; Schroer; Adjunct Assistant Professor Carter.

Environmental science courses are taken for several purposes: as a minor, to earn an environmental science certificate, as part of a composite major, and as electives. The certificate program is designed to prepare scientists, mathematicians, and engineers to solve problems relating to man’s interaction with the natural environment. The certificate is a supplement to the bachelor’s, master’s, or doctor’s degree and signifies that the holder has broadened his perception of the physical and organic environment by studying the entire spectrum of natural science (atmosphere, biosphere, hydrosphere, and lithosphere), and by specializing in environmental aspects of his field.

Many courses necessary to earn the certificate are automatically taken as part of the student’s AOC major or his GER. Other required courses can be taken as electives, permitting the fully prepared bachelor’s candidate to complete requirements for his degree and the certificate with the usual number of credit hours required for the bachelor’s degree alone.

Composite Major in Environmental and Biological Sciences

<table>
<thead>
<tr>
<th>Course Area</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER (humanities and social sciences, EC or PSC recommended)</td>
<td>36</td>
</tr>
<tr>
<td>Mathematics (including ST 281 if Level III placement)</td>
<td>9</td>
</tr>
<tr>
<td>Physics--PH 101, 102 or 111, 112</td>
<td>8</td>
</tr>
<tr>
<td>Chemistry--CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362</td>
<td>22</td>
</tr>
<tr>
<td>Environmental Science--ES 202, 303 or 304, 311, 321</td>
<td>13</td>
</tr>
<tr>
<td>Biological Sciences--BYS 113, 114, 221, 312, 319, and MS 507, BYS 531 or BYS 561</td>
<td>23</td>
</tr>
<tr>
<td>BYS electives</td>
<td>12-14</td>
</tr>
<tr>
<td>One from 315, 317, 378</td>
<td>4-5</td>
</tr>
<tr>
<td>One from 562, 563, 564</td>
<td>4</td>
</tr>
<tr>
<td>One from 364, 368, 372</td>
<td>4-5</td>
</tr>
<tr>
<td>Computer Science--CS 113</td>
<td>3</td>
</tr>
<tr>
<td>Free electives (to include statistics if not MA level III placement)</td>
<td>9-11</td>
</tr>
</tbody>
</table>

Requirements for the Environmental Science Certificate

Basic science courses (unless exempted by advanced placement and/or testing in each case): Biological Sciences 113, 114; Chemistry 121, 123, 125, 126; Environmental Science 201, 202; Physics 111, 112; two basic courses in statistics and/or computer science.

Environmental core courses:
BY 312 Principles of Ecology
ES 321 Pollution Problems
ES 521 Environmental Data Analysis
Advanced level specialization (9 hours required in courses in student’s major or area of interest chosen from the following):

- BYS 526 Microbial Ecology
- BYS 561 Physiological Ecology
- BYS 562 Community Ecology
- BYS 563 Population Ecology
- BYS 564 Limnology
- MS 502 Marine Geology
- MS 509 Marine Ecology
- MS 510 Marsh Ecology
- CH 525 Environmental Chemistry
- EG 422 Systems Analysis
- EG 427 Management Science
- EG 524 Introduction to Human Engineering
- EG 549 Environmental Engineering
- EG 559 Selected Topics in Mechanical Engineering
- ES 303 Climatology
- ES 304 Meteorology
- ES 311 Geology and Hydrology
- ES 591 Review of Environmental Research
- ES 593 Directed Studies in Environmental Science
- ES 594 Methods in Environmental Science
- ES 596 Environmental Science Experimentation

Requirements for a Minor in Environmental Science
A student in any area of study may build a minor in environmental science with approval of the adviser in his department. Minor is tailored to student’s needs through consultation with department adviser and the Environmental Science Committee chairman.

Environmental Science (ES)

201 Planetary and Atmospheric Science 3 hrs.
Spatial relationships of earth, moon, and sun that determine figure of earth, earth motions, time, seasons, atmospheric and oceanic circulation, weather, and climates. Practical and field work. Prerequisites: MA 121 (or level III placement) and 8 semester hours of 100-level laboratory science courses.

202 Physical Geology 4 hrs.
Nature and evolution of earth’s continents and ocean basins, rocks and minerals, landscape formation by rock weathering, surface and ground water. Volcanoes and related igneous activity, glaciers, wind, ocean currents, and waves. Crustal deformation and balance, continental drift, earthquakes, interior heat, gravity, and magnetism. Lunar and planetary geology. Laboratory and field work. Lab fee: Level 3. Prerequisites: 8 semester hours of 100-level laboratory science courses.

303 Climatology 3 hrs.
Classification definition of types of climate, processes of atmospheric dispersions—turbulent transfer and diffusion, environmental alterations by man, climate and ecology relationships. Prerequisites: ES 201, MA 105, or approval of instructor.
304 Meteorology 3 hrs.
Physical properties and dynamics of atmosphere, factors that govern weather conditions, meteorological factors affecting design and operation of aircraft, and weather research. Prerequisites: ES 201 and MA 151 or MA 154 or approval of instructor.

311 Geology and Hydrology 3 hrs.
Geological and hydrologic constraints on land use. Influence of topography; energy, mineral, soil, and water resources; and geologic and hydrologic hazards. Fundamentals of hydrology. Prerequisite: ES 202 or permission of instructor.

312 Principles of Ecology 4 hrs.
Ecological principles controlling plant and animal populations. Development of ecosystems, communities and habitats. One 4 hour lab a week. Field trips required. Lab fee: Level 4. Prerequisites: BYS 113, 114, CH 101 (121); BYS 238 desirable.

321 Pollution Problems 3 hrs.
Quantitative descriptions of environmental conditions, regulations, and abatement technology. Specific pollution problems with air, water, noise, and radiation; assessment of environmental impacts of development or construction projects. Prerequisites: sophomore standing and approval of instructor.

521 Environmental Data Analysis 3 hrs.
Overview of computer hardware, software, communications, and terminals. Univac control languages, management information systems, overview of techniques of modeling, and simulation as applied to air, water, and noise pollution. Prerequisites: computer programming, systems analysis, and statistics.

591 Review of Environmental Research 1-4 hrs.
Review of selected environmental science investigations. Prerequisite: approval of instructor.

593 Directed Studies in Environmental Science 1-4 hrs.
Supervised compilation, summarization, and discussions of environmental investigations, regulations, and topics. Prerequisites: junior standing and approval of instructor.

594 Methods in Environmental Science 1-4 hrs.
Principles and applications relative to aspects of the environment. Prerequisites: junior standing and approval of instructor.

596 Environmental Science Experimentation 1-4 hrs.
Application of principles of one or more of environmental sciences to solution of environmental problems. Prerequisites: junior standing and approval of instructor.
Mathematics Department and Statistics

Professors Doss, Gibson, Hoomani; Associate Professors Chang, Cook (chairman), Forte, Roach, Slater; Assistant Professors Castellano, Chen, Cromer, Dow, Howell, Krishna, Morales, Siegrist, Welstead; Instructor Spilman.

Undergraduate Programs

The mathematics faculty offers courses in mathematics (MA) and statistics (ST) for a B.S. or B.A. degree in mathematics, a B.S. or B.A. degree in mathematics education, or a minor in mathematics for students majoring in other areas. Courses also satisfy individual needs to supplement other areas of study and to satisfy GER.

All AOC's with a major in mathematics must include MA 153, 154, 233, 244, 251, 440, and 502 (basic core—21 semester hours). Other MA courses and electives in MA courses are required, depending on the curriculum the student is pursuing. Details concerning these courses and electives are given in Curricula I, II, and III. All MA electives must be preapproved by the student’s faculty adviser.

All AOC's with a double major in mathematics education and elementary education (Curriculum IV) must include MA 153, 154, 233, 244, 333, 385, 440, and two approved MA courses at 300 level or above.

Students majoring in other academic areas may include only MA courses numbered above 150 in their AOC. A typical mathematics minor consists of MA 153, 154, 233, 244, 251, and two approved MA courses numbered above 300. All MA minors must include MA 153 and 154.

No student may enroll in his first MA course at UAH before determination of his placement level. Students who have no previous college credit in mathematics are placed at Level I, II, or III according to their high school mathematics background and their ACT scores in mathematics.

Students who are not planning to continue in mathematics but who need 3 to 9 hours to satisfy GER should make their choice from the sequence MA 105 (104), 143, 151, 244, ST 281, MA 333, and 385 beginning with the course indicated by their placement level.

Students who may continue in mathematics and need 3 to 9 hours to satisfy GER should make their choice from the sequence MA 119, 121, 153, 154, 233, 244, beginning with the course indicated by their placement level.

Students with various placement levels must begin their MA courses for credit as follows: Level I—MA 104 or 105 or 119; Level II—MA 121 or 143; Level III—MA 151 or 153.

The following courses are listed as examples of approved curricula. Students who feel that substitutions can produce a program better suited for their needs should consult their faculty adviser about the feasibility of such substitutions.

Curriculum I

B.A. or B.S. degree with a major in mathematics

<table>
<thead>
<tr>
<th>General Education Requirements:</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>English and history</td>
<td>18</td>
</tr>
</tbody>
</table>

305
Language (French, German or Russian recommended) ................................................. 6-12
Social science (one discipline) ................................................................................. 6
Mathematics (courses numbered below 150) .......................................................... 0-6
CS 113 and ST 281 ..................................................................................................... 6
Laboratory science ..................................................................................................... 8-16
(Note: Math majors taking physics courses must choose from the sequence PH 111, PH 112, PH 113.)
For B.A. ....................................................................................................................... 8 hours in physics
For B.S. ....................................................................................................................... 8 hours in physics and 8 hours in biological science or chemistry

Mathematics Major (minimum requirements):
MA basic core, MA 352, and two of MA 425, 542, 551 ............................................... 30
MA electives (must be preapproved by student’s mathematics adviser and be at 300 level or above) .............................................................. 6
(Note: MA 570 is recommended for students preparing for graduate study in mathematics.)
Minor ............................................................................................................................ 21-24
Electives (to total number of semester hours to 128) .............................................. 4-27

**Curriculum II**

B.A. or B.S. degree with a major in mathematics. This plan meets requirements for an Alabama Class B High School Teachers Certificate.

GER (humanities and social sciences) ................................................................. 30-36
Mathematics - MA basic core, MA 333, 385 and 6 hours of electives numbered 300 or above, including at least one 500 level course, approved by student’s mathematics adviser (minimum requirements) ......................................................... 33
Physics - PH 111, 112 .................................................................................................. 8
Statistics - ST 281 .................................................................................................... 3
Computer Sciences - CS 113 .................................................................................... 3
Biological Sciences (minimum requirement) ........................................................... 4
Second Teaching Area .............................................................................................. 27
Professional Education Courses .............................................................................. 33

NOTES:
1. This curriculum will probably require more than the minimum total of 128 semester hours.
2. Students pursuing this curriculum should consult with the Department of Education early in their program.

**Curriculum III**

B.A. or B.S. degree with a major in mathematics. This plan meets requirements for an Alabama Class B Middle/Junior High School Teachers Certificate.

GER (humanities and social sciences) ................................................................. 30-36
Mathematics (minimum requirements — same as Curriculum II) ......................... 33
Physics - PH 111, 112 .................................................... 8
Statistics - ST 281 .................................................. 3
Computer Science - CS 113 ....................................... 3
Biological Sciences (minimum requirement) ................. 4
Second Teaching Area ............................................. 27
Professional Education Courses ................................. 33

NOTES:
1. This curriculum will probably require more than the minimum total of 128
   semester hours.
2. Students pursuing this curriculum should consult with the Department of
   Education early in their program.

Curriculum IV
   B.A. or B.S. degree with a double major in mathematics education and
   elementary education. This plan meets requirements for an Alabama Class B
   Elementary Teachers Certificate.

(NOTE: For general education requirements and professional education
   courses see Department of Education section.)

Mathematics Education (minimum requirements — applicable to this AOC
   only.) MA 153, 154, 233, 244, 333, 385, 440 and two MA electives numbered
   300 or above which have been preapproved by student’s mathematics adviser
   ................................................................. 27

NOTES:
1. This curriculum will probably require more than the minimum total of 128
   hours.
2. Students pursuing this curriculum should consult with the Department of
   Education early in their program.
3. Students who elect this curriculum will not be adequately prepared for
   graduate study in mathematics.

Approved Minors
   A student who majors in mathematics is strongly encouraged to select a
   minor in science or engineering. Typically, such a student minors in computer
   science, physics, operations research, or chemistry, but other options are
   available. Any minor must include at least 21 hours in one discipline, with a
   minimum of 6 hours at 300 level or above. All courses in a minor must be ap­
   proved by the department concerned and the student’s mathematics faculty
   adviser.

Graduate Programs
   The mathematics graduate faculty offers courses in mathematics (MA) and
   statistics (ST) to satisfy the requirements for an M.A. degree in mathematics
   and to satisfy individual needs for courses to supplement other areas of study.
   The Ph.D. degree in mathematics can be earned through a cooperative pro-
gram with the Tuscaloosa campus. Students interested in the cooperative pro-
gram should contact the chairman of the Mathematics Department.

The graduate faculty of the department realizes that entering graduate
students will have a variety of mathematical backgounds and goals. Conse-
quently, programs of study leading to the M.A. degree can vary considerably.
Each graduate student is assigned an adviser who works closely with the stu-
dent to design an individualized program to meet the student's needs. All pro-
grams of study must meet the Graduate School requirements (see School of
Graduate Studies). Programs of study that include a thesis (Plan 1) require at
least 24 hours of course work, and programs of study without a thesis (Plan 2)
require at least 33 hours of course work.

Four main groups of M.A. or Ph.D. students have been identified:

a. Those who plan to work in industry or government who will need con-
siderable depth in areas of probability and statistics

b. Those who plan to work in industry or government who will need
depth, breadth, or both in other applicable areas

c. Those who plan to concentrate their studies in mathematical areas that
do not directly relate to problems in industry or government

d. Those teachers who hold the Class B Middle/Junior High or Secondary
School Teachers Certificate and who wish to earn the Class A Teachers
Certificate

For students who fall into any one of these four groups, programs of study
can be developed to meet both their short- and long-term goals.

To illustrate merely a few of the many possibilities, some examples of non-
thesis programs in each of the four categories are listed below.

For a student in (a), a program might be MA 544, 570, 585, 653, 656, 685,
ST 687, MA 686 or ST 787, and three approved elective courses.

For a student in (b) who wishes to develop a broad general background, a
program might be MA 526, 542, 544, 570, 585, 615, 625, 640, 656, and two ap-
proved elective courses. For a student in (b) who wishes to concentrate in
numerical analysis, a program might be MA 515, 525, 526, 544, 570, 614, 615,
and four approved elective courses. Other concentration areas could be dif-
ferential equations, optimization, or combinatorics and graph theory. A
minor in an area outside of mathematics might also be a desirable part of a
program for a student in (b).

For a student in (c), a program might be MA 542, 570, 653, 656, 671, two of
MA 643, 644, 670, 754, 756, and four approved elective courses.

For a student in (d), a program might be MA 542, 544, 570, 585, 614, 633,
ST 687, 9 hours of appropriate education courses, and one approved elective
course.

In addition to fulfilling Graduate School requirements, all applicants for
graduate study in mathematics should have completed the equivalent of MA
153, 154, 233, 244, 251, 440, 502, and 6 additional hours in upper division
courses. Students who are deficient in more than two undergraduate courses in
mathematics must remove these deficiencies before admission to the
mathematics program. Such students should consult the chairman of the
Mathematics Department on how best to remove these deficiencies.
Applicants for unconditional admission to Graduate School in mathematics must satisfy all Graduate School requirements (see School of Graduate Studies). Only the aptitude portion of the GRE is required by the department. The Miller Analogies Test, administered regularly on campus, is accepted by the department in lieu of the GRE for probationary admission to Graduate School. (See School of Graduate Studies for details on probationary admission.)

Mathematics (MA)

NOTE:
1. No student may receive more than 6 hours credit for MA courses numbered below 150 or more than 3 hours credit for MA courses numbered below 120.
2. Students placed at Level II may receive no more than 3 hours credit for MA courses numbered below 150.
3. Students placed at Level III will receive no credit for MA courses numbered below 150.
4. Students with deficiencies of high school algebra or high school geometry credit must remove these deficiencies before enrollment in MA courses numbered 100 or above.
5. No student may enroll in his first MA course at UAH before determination of his placement level.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
<th>Prerequisites/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>004</td>
<td>Basic Algebra</td>
<td>No credit</td>
<td>For students with a deficiency in high school credit in algebra or a need for algebra review.</td>
</tr>
<tr>
<td>033</td>
<td>High School Geometry</td>
<td>No credit</td>
<td>For students with a deficiency in high school credit in geometry. Prerequisite: MA 004 or Level I placement.</td>
</tr>
<tr>
<td>104</td>
<td>Introduction to Contemporary Math.</td>
<td>3 hrs.</td>
<td>No credit given to students who have received credit for another MA course or who are placed at Level II or above. Introduction to mathematical reasoning, sets, set operations and relations, system of whole numbers, numeration systems, fundamental algorithms, integers, rational numbers, real numbers, elementary number theory. Prerequisites: one unit of high school algebra and Level I placement.</td>
</tr>
<tr>
<td>105</td>
<td>College Algebra</td>
<td>3 hrs.</td>
<td>No credit given to students who have received credit for another MA course or who place at Level II or above. Sets, the real number system, equations in one variable, polynomials, rational expressions, exponents and radicals, inequalities, relations and functions, exponential and logarithmic functions. Prerequisites: one unit each of high school algebra and high school geometry, and Level I placement.</td>
</tr>
<tr>
<td>119</td>
<td>Precalculus I</td>
<td>3 hrs.</td>
<td>Should be taken only by students who are going on to MA 121 and MA 153. No credit given to students who have received credit for another MA course or who place at Level II or above. Sets, real numbers, absolute values, cartesian coordinates, relations and functions, graphs, composite and inverse functions, linear equations, quadratic equations, exponential and logarithmic functions. Prerequisites: one unit each of high school algebra and geometry, and Level I placement.</td>
</tr>
</tbody>
</table>
121 **Precalculus II** 3 hrs.
Should be taken only by students who are going on to MA 153. No credit given to students who have successfully completed an MA course numbered above 121 or who place at Level III. Trigonometric functions, applications of trigonometry, solution of right and oblique triangles, inverse trigonometric functions, trigonometric equations and identities, complex numbers, polynomials, systems of equations, mathematical induction, binomial theorem. Prerequisite: MA 119 or Level II placement. Students are advised not to take MA 121 before earning a grade of “C” or better in MA 119.

143 **Finite Mathematics** 3 hrs.
No credit given to students who have successfully completed MA 121 or a higher level MA course or who place at Level III. Elementary logic, sets, functions, relations, systems of linear equations, counting, matrices, probability, decision theory, linear programming. Prerequisite: MA 104 or 105 or Level II placement.

151 **Survey of Elementary Calculus** 3 hrs.
No credit given to students who have received credit for any other calculus course. Students planning to continue in calculus should begin with MA 153 instead of this course. Limits, continuity, derivatives, chain rule, derivative tests, logarithm and exponential functions, applications of the derivative, antiderivatives, fundamental theorem of calculus, applications of the integral. Prerequisites: MA 143 or Level III placement.

153 **Calculus and Analytic Geometry** 3 hrs.
Limits, continuity, derivative, differentials, chain rule, implicit differentiation, applications of the derivative, definite integral, fundamental theorem of calculus, indefinite integrals. Prerequisite: MA 121 or Level III placement. Students are advised not to take MA 153 before earning a grade of “C” or better in MA 121.

154 **Calculus and Analytic Geometry** 3 hrs.
Exponential and logarithmic functions, inverse trigonometric functions, hyperbolic functions, l'Hopital's Rule, techniques of integration, improper integrals, applications of the integral. Prerequisite: MA 153. Students are advised not to take MA 154 before earning a grade of “C” or better in MA 153.

233 **Calculus and Analytic Geometry** 3 hrs.
Sequences and series, conic sections, vectors and analytic geometry in three dimensions, vector-valued functions. Prerequisite: MA 154. Students are advised not to take MA 233 before earning a grade of “C” or better in MA 154.

244 **Introduction to Linear Algebra** 3 hrs.
No credit given to students who have successfully completed either MA 440 or MA 502. Such students must substitute MA 544. Systems of linear equations, matrices, matrix operations, determinants, vector spaces, bases, dimension of a vector space, inner product, Gram-Schmidt process, linear transformations, change of basis, similar matrices, eigenvalues and eigenvectors, diagonalization, symmetric matrices, and applications. Prerequisite: MA 233 or MA 151 and approval of instructor.

251 **Calculus and Analytic Geometry** 3 hrs.
Partial differentiation, chain rule, directional derivatives, tangent plane, Lagrange multipliers, multiple integration, vector fields, line integrals, Green's Theorem, divergence and curl, surface integrals, Stokes' Theorem. Prerequisite: MA 233.

333 **Introduction to Geometry** 3 hrs.
Axiomatic development of geometry. Introduction to non-Euclidean geometries with emphasis in elliptic and hyperbolic geometries. Selected topics in Euclidean geometry. Prerequisite: MA 244 or approval of instructor.
352 Introduction to Differential Equations 3 hrs.
First-order differential equations, linear differential equations, linear differential equations with variable and constant coefficients, variation of parameters, Laplace transforms, series solutions, selected applications. Prerequisite: MA 251. MA 244 recommended before taking this course.

355 Mathematical Techniques in Computer Graphics 3 hrs.
A study of some of the mathematics used in computer graphics. Rotations, translations, projections, hidden line removal. Methods for rotating three space which involve real and complex matrix multiplication and the quaternionic number system are presented. Students participate in a computer graphics project which further illustrates the mathematical concepts discussed in class. Lab fee: Level 4. Prerequisites: MA 244, 251, CS 113.

385 Introduction to Probability 3 hrs.
No credit given to students who have successfully completed MA 585. Finite probability spaces, conditional probability, random variables, expectations, variances, covariances, introduction to binomial, Poisson, uniform, exponential, and normal distributions, and use of statistical package MINITAB. Prerequisites: MA 151 or 154, and one MA course at the 200 level or above.

415 Introduction to Numerical Methods 3 hrs.
Iterative methods for solution of nonlinear equations, error analysis, acceleration of convergence, interpolation and approximation of functions, numerical integration. Student should be able to use at least one scientific computer language. Lab fee: Level 3. Prerequisites: MA 244, 251, or approval of instructor.

425 Introduction to Mathematical Modeling 3 hrs.
The purpose of this course is to apply mathematics by formulating, analyzing, and criticizing mathematical models of various phenomena. Examples will be chosen from the physical, biological, and social sciences. The course emphasizes development and use of simple mathematical models by having students study general modeling principles and case studies (some open-ended) drawn from various sources. Prerequisite: MA 244, 352.

440 Introduction to Discrete Mathematics 3 hrs.
Logic and mathematical proofs, mappings, binary operations, equivalence relations, groups and subgroups, Lagrange's theorem, homomorphisms and isomorphisms, normal subgroups and quotient groups, rings, integral domains, fields, error correcting codes, linear codes, decoding, partially ordered sets, lattices, Boolean algebras, and applications. Prerequisites: MA 244 and at least one MA course at 300 level or above.

454 Introduction to Integral Equations 3 hrs.
Volterra equations, convolution equations, the resolvent, Fredholm equations, Green's functions, the Fredholm alternative, and approximate methods of solution. Prerequisites: MA 244, 352.

490 Selected Topics in Undergraduate Mathematics 1-3 hrs.
Courses in requested undergraduate topics. Prerequisite: approval of instructor.

502 Introduction to Real Analysis 3 hrs.
Sequences, limits, continuity, differentiation of functions of one real variable, Riemann integration, uniform convergence, sequences and series of functions, power series, and Taylor series. Prerequisite: MA 352 or 440 or approval of instructor.
Explicit and implicit methods for numerical integration of ordinary differential equations, error bounds, convergence, extrapolation, boundary value problems, introduction to finite difference methods in partial differential equations. Student should be able to use at least one scientific computer language. Lab fee: Level 3. Prerequisites: MA 244, 352.

Introduction to Complex Analysis 3 hrs.
Complex algebra, analytic functions, Cauchy-Riemann equations, exponential, trigonometric, and logarithmic functions, integration, Cauchy integral theorem, Morera's theorem, Liouville's theorem, maximum modulus theorem, residue theory, Taylor and Laurent series, and applications. Prerequisite: MA 502 or approval of instructor.

Intermediate Differential Equations 3 hrs.
Systems of linear ordinary differential equations, first order systems with constant coefficients, plane autonomous systems, stability, and selected topics related to properties and characterization of solutions. Prerequisite: MA 352 or approval of instructor.

Partial Differential Equations I 3 hrs.
Systems of first order ordinary differential equations, first order quasilinear partial differential equations, general first order partial differential equation by Cauchy's method of characteristics, higher-order equations, canonical forms, separation of variables, Fourier series, wave equation, heat equation, and potential equation. Prerequisite: MA 352.

Advanced Vector Calculus 3 hrs.
Brief review of vector algebra and calculus of vector-valued functions, representation of vector operators in curvilinear coordinates, line and surface integrals, theorems of Gauss, Green, and Stokes, Jacobian, and changes of variables in multiple integrals. Prerequisite: MA 352 or approval of instructor.

Combinatorics 3 hrs.
Counting, pigeonhole principle, permutations and combinations, generating functions, principle of inclusion and exclusion, Polya's theory of counting. Prerequisite: MA 440 or approval of instructor.

Algebra 3 hrs.
Topics from group theory and ring theory: subgroups, normal subgroups, quotient groups, homomorphisms, isomorphism theorems, ideals, principal ideal domains, Euclidean domains, fields, extension fields, elements of Galois theory. Prerequisite: MA 440 or approval of instructor.

Linear Algebra 3 hrs.
Vector spaces, bases, linear transformations, matrices, determinants, eigenvalues, similarity, matrix limits, dual spaces, bilinear forms, quadratic forms, orthogonal and unitary transformations. Prerequisites: MA 244 and at least one MA course at 300 level or above.

Functions of Several Variables 3 hrs.
Topology of Euclidean spaces, limits, continuity, and differentiation of functions of several real variables, Jacobians, implicit function and inverse function theorems, Riemann integration of functions of several real variables, and change of variables theorem for multiple integrals. Prerequisite: MA 502.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>570</td>
<td>Metric Spaces with Applications</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>585</td>
<td>Probability</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Probability theory and its applications. Independent trials, discrete and continuous random variables, law of large numbers, basic distributions, sums of independent random variables, sequences of random variables, central limit theorem and convergence in distribution. Prerequisites: MA 251 and one of MA 385, EG 390, ST 281, or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>590</td>
<td>Selected Topics in Mathematics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Courses in requested selected topics. Prerequisite: Approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>614</td>
<td>Numerical Methods for Linear Algebra</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Norms and vector spaces, matrix factorizations and direct solution methods, least squares methods, stability and conditioning, iterative refinement and updating decompositions, algebraic eigenvalue problems, and QR algorithms. Lab fee: Level 4. Prerequisites: MA 544 and CS 113 or EG 197.</td>
<td></td>
</tr>
<tr>
<td>615</td>
<td>Numerical Methods for Partial Differential Equations</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Finite difference methods for parabolic, elliptic, and hyperbolic partial differential equations; error analysis, stability, and convergence of finite difference methods. Lab fee: Level 4. Prerequisites: MA 244, 352, and CS 113 or EG 197.</td>
<td></td>
</tr>
<tr>
<td>621</td>
<td>Special Functions</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Gamma and beta functions, probability integral and applications, orthogonal polynomials, Bessel functions and their applications, spherical harmonics and their applications, hypergeometric functions. Prerequisite: MA 521.</td>
<td></td>
</tr>
<tr>
<td>625</td>
<td>Calculus of Variations</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Problems in calculus of variations, necessary and sufficient conditions for extrema of a definite integral in both parametric and nonparametric representations in the plane, Bolza problem. Prerequisite: MA 502 or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>626</td>
<td>Partial Differential Equations II</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Potential theory, variational and transform methods, integral equations, perturbation theory, and special topics in the theory of partial differential equations and their applications. Prerequisite: MA 526.</td>
<td></td>
</tr>
<tr>
<td>633</td>
<td>Geometry</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Axioms of incidence and order, affine structure of the plane, metric properties, isometries, similarity transformations, the group of angles, orientation. Prerequisites: MA 440, 544 or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>640</td>
<td>Graph Theory</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Graphs, subgraphs, trees, connectivity, Euler tours, Hamilton cycles, matchings, edge colorings, independent sets, vertex colorings, planar graphs, Kuratowski's Theorem, four-color theorem, directed graphs, networks, cycle and bond spaces. Prerequisite: MA 540 or 542.</td>
<td></td>
</tr>
<tr>
<td>643</td>
<td>Group Theory</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Isomorphism theorems, permutation groups, basis theorem and fundamental theorem for finite abelian groups. The Remak-Krull-Schmidt theorem, Sylow theorems, normal series, solvable groups, extensions, and selected topics in representation theory. Prerequisite: MA 542.</td>
<td></td>
</tr>
</tbody>
</table>
Matrix Theory 3 hrs.
Functions of matrices, invariant polynomials, elementary divisors, similarity of matrices, normal forms of a matrix, matrix equations, generalized inverses, non-negative matrices, localization of eigenvalues. Prerequisite: MA 544.

Advanced Differential Equations 3 hrs.
Approximate methods, oscillations and periodic solutions, stability and Liapunov theory, delay equations, and selected topics. Prerequisite: MA 502, 525.

Real Analysis I 3 hrs.
Archimedian ordered fields, real number system, characterization of open and closed sets, Lebesgue measure of open, closed, G-delta and F-sigma sets, sigma algebra of measurable sets, measurable functions, theorems of Riesz, Egorov, and Luzin, sequences of measurable functions, Riemann integral, Lebesgue integral of bounded, nonnegative functions and of general measurable functions, Fatou’s lemma, and Lebesgue-dominated convergence theorem. Prerequisite: MA 570 or 551 and one MA course at the 540 level or above.

Complex Analysis I 3 hrs.
Topology of the complex plane, analytic functions of one complex variable, elementary functions and their mapping properties, power series, complex integration, Cauchy’s theorem and its consequences, isolated singularities, Laurent series, residue theory. Prerequisites: MA 502, 551 or approval of instructor.

Introduction to Functional Analysis 3 hrs.
Normed and inner product spaces, finite dimensional spaces, product and quotient spaces, equivalent norms, Hahn-Banach theorem, principle of uniform boundedness, open-mapping theorem, Riesz representation theorem, complete orthonormal sets, Bessel’s inequality, Parseval’s identity, and conjugate spaces. Prerequisite: MA 570.

General Topology 3 hrs.
Set theory, logic, well-ordering principle, axiom of choice, topological spaces, product spaces, quotient spaces, continuous functions, connectedness, path connectedness, local connectedness, compactness, local compactness, countability and separation, generalized products, Tychonoff theorem. Prerequisite: MA 570.

Stochastic Processes with Applications I 3 hrs.
Discrete and continuous Markov chains, Poisson processes, counting and renewal processes, and applications. Prerequisites: MA 585, 244 or approval of instructor.

Stochastic Processes with Applications II 3 hrs.
Gaussian and Wiener processes, general Markov processes, special types of processes from queueing and risk theory, and selected advanced topics. Prerequisite: MA 685 or approval of instructor.

Special Topics in Mathematics 3 hrs.
Courses in requested special topics. Prerequisite: Approval of instructor.

Master’s Thesis 3 hrs.
Required each term a student is working and receiving direction on his master’s thesis. A minimum of two terms is required for Plan I MA students. Maximum of 9 hours credit awarded upon successful completion of the master’s thesis.
Real Analysis II
Vitali's covering theorem, differentiability of monotone functions, functions of bounded variation, absolute continuity, Lebesgue integral of derivative of an absolutely continuous function, Minkowski and Holder inequalities, $L^p$ spaces, Riesz-Fischer representation theorem, abstract measure spaces, equivalence and singularity of measures, Radon-Nikodym theorem, Fubini's theorem, signed measures, and selected topics. Prerequisite: MA 653.

Complex Analysis II
Applications of residue theory, harmonic functions and their applications, Mittag-Leffler theorem, infinite products, Weierstrass product theorem, conformal mapping and Riemann mapping theorem, univalent functions, analytic continuation and Riemann surfaces, Picard's theorems, and selected topics. Prerequisite: MA 656 or approval of instructor.

Graduate Seminar
Selected topics for students in the cooperative Ph.D. program. Prerequisite: Approval of instructor.

Doctoral Dissertation
Required each term a student is working and receiving direction on his Ph.D. thesis in the cooperative Ph.D. program. Prerequisite: Approval of instructor.

Statistics (ST)

Elements of Statistical Inference
Descriptive statistics, fundamentals of probability theory, fundamentals of statistical inference, including estimation and hypothesis testing, and use of statistical package MINITAB. Lab fee: Level 3. Prerequisite: MA 154 or 151. Student cannot receive credit for more than one of ST 281, 287, or MSC 287 or AHS 300.

Applied Statistics
Collection and presentation of data, averages, dispersion and skewness, binomial, normal, $X^2$, $t$, and F-distributions, estimation, confidence intervals and tests of significance, and use of statistical package MINITAB. Lab fee: Level 3. Prerequisites: MA 104 or 105 or 119 or Level II placement. Student cannot receive credit for more than one of ST 281, 287, or MSC 287, or AHS 300.

Elements of Statistical Analysis
Analysis of variance and multiple comparisons, analysis of covariance, multiple regression and correlations, nonparametric methods, and use of statistical package MINITAB. Lab fee: Level 3. Prerequisite: ST 281 or approval of instructor.

Theory of Statistics I
Distribution of statistics based on ordered samples, asymptotic sampling distributions, maximum likelihood, least squares, and other methods of point estimation, Rao-Blackwell theorem and Cramer-Rao inequality, confidence intervals, regions, and their optimal properties. Neyman-Pearson formulation and tests of simple hypothesis against simple alternatives. Prerequisites: MA 244, 585.

Theory of Statistics II
Continuation of hypothesis testing, likelihood ratio and unbiased tests, uniformly most powerful tests, power function, nonparametric tests, statistical decision theory, distribution and linear models. Prerequisite: ST 687.
## Physics Department

Professors Anderson, Chan, Smalley (chairman), Sung; Research Professors Barr, McKnight; Adjunct Professors Stuhlinger, Tandberg-Hanssen, Stettler, Wu; Associate Professors Davis, Horwitz, Rush; Associate Research Professor Hendricks; Assistant Professors Emslie (Von Braun Fellow); Associate Research Professor Comfort; Assistant Research Professors Olsen, Paciesas.

### Undergraduate Program

The basic courses for a B.S. degree with a major in physics include PH 111, 112, 113, 201, 241, 310, 311, 312, 321, 331, 351. Three approved AOC’s are listed. Other AOC’s may be approved after consultation with student’s faculty adviser.

### Curriculum I

For working professionally at the B.S. level or preparation for graduate school.

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER (humanities and social sciences)</td>
<td>30-36</td>
</tr>
<tr>
<td>Physics—PH 111, 112, 113, 201, 241, 310, 311, 312, 321, 331, 337, 351, 401, 431, one senior lab at 400 level, 551, 552.</td>
<td>45</td>
</tr>
<tr>
<td>Mathematics—MA 153, 154, 233, 244, 251, 352, 502, 521.</td>
<td>24</td>
</tr>
<tr>
<td>Chemistry—CH 121-123, 125, 126</td>
<td>8</td>
</tr>
<tr>
<td>Electives</td>
<td>15-21</td>
</tr>
</tbody>
</table>

### Curriculum II

Natural science AOC with emphasis on physics.

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER (humanities and social sciences)</td>
<td>30-36</td>
</tr>
<tr>
<td>Physics—PH 111, 112, 113, 106, 107, 201, 241, 310, 311, 312, 331, 351.</td>
<td>33</td>
</tr>
<tr>
<td>Chemistry—CH 121-123, 125, 126, 331, 332, 333, 335</td>
<td>15</td>
</tr>
<tr>
<td>Mathematics—MA 153, 154, 233, 244, 251, 352</td>
<td>18</td>
</tr>
<tr>
<td>Biological Sciences—BYS 113-114, 319, 3 hours elective</td>
<td>14</td>
</tr>
<tr>
<td>Electives</td>
<td>15-21</td>
</tr>
</tbody>
</table>

### Curriculum III

B.S. degree with major in physics. This plan meets requirements for an Alabama Class B High School Teachers Certificate.

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER (humanities and social sciences)</td>
<td>30-36</td>
</tr>
<tr>
<td>Physics—PH 111, 112, 113, 201, 241, 310, 311, 312, 321, 331, 351, 401, 431, one senior lab at 400 level, 551, 552.</td>
<td>45</td>
</tr>
<tr>
<td>Mathematics—MA 153, 154, 233, 244, 251, 352, 502, 521.</td>
<td>24</td>
</tr>
<tr>
<td>Chemistry—CH 121-123, 125, 126</td>
<td>8</td>
</tr>
<tr>
<td>Biological Sciences (minimum of 4 hours)</td>
<td>4</td>
</tr>
<tr>
<td>Second Teaching Area</td>
<td>27</td>
</tr>
<tr>
<td>Professional Education Courses.</td>
<td>33</td>
</tr>
</tbody>
</table>
NOTES:
1. This curriculum will probably require more than the minimum total of 128 semester hours.
2. Students pursuing this curriculum should consult with the Department of Education early in their program.
3. It is possible for the general requirements to count toward the second teaching area. Early academic advisement is recommended for students who wish to pursue this option.
4. A general sciences composite major covering the areas of chemistry, biological sciences, environmental science and physical sciences is possible under this curriculum. Interested students should consult the Education Department.

Graduate Programs
The physics faculty offers programs leading to the Master of Science degree under Plan I and Plan II and to the Doctor of Philosophy degree.

General information about the graduate program at UAH and general requirements for advanced degrees are given in Graduate Studies section. Besides meeting general admission requirements for graduate work, an entering student must take a placement examination during the first week of his first term of graduate study. Its purpose is to help the student and his adviser decide the best program of study. After taking the placement examination, the student must complete a program approval form in consultation with his adviser. The advanced portion of the GRE in Physics may be used to supplant the placement examination.

Master of Science
Each student must take PH 792 (Physics Seminar) for two terms. Two options are available for the Master of Science degree under Plan II:
A. Theoretical Physics Option: PH 601, 622, and 631 are required. PH 732, 751, 752 are also recommended. This option is designed for students who desire to complete course requirements early for an advanced degree program.
B. Applied Physics Option: PH 601, 622, and 631 are required and at least three additional courses designed to stress applications to various branches of physics. Since many of these topics are contemporary in nature, advance topics normally occur under the heading Selected Topics. Frequently offered selected topics courses include Fourier optics, laser physics, electron-spin, resonance, microwave properties of solids, physics of plasmas, superconductivity. These additional courses can best be arranged through consultation with student's adviser. Each candidate for the Master of Science degree must also pass the comprehensive examination, which is normally administered during spring term.

The physics faculty encourages students to carry out programs of study oriented toward applied physics. For this purpose Selected Topics 680-689 and 780-789 are offered frequently in areas such as laser physics, properties of materials, and phases of matter.
Doctor of Philosophy

A statement of procedures for admission to the Ph.D. program in physics may be obtained from the Physics Department office.

Admission to the Ph.D. program in physics is dependent on performance on the Master of Science Comprehensive Examination. Students entering UAH with an M.S. degree or previous graduate training in physics must take the MS comprehensive examination at their earliest opportunity.

A minimum of 48 hours of graduate course credit is required for the Ph.D. in physics. Physics 601, 622, 631, 732, 751, 752 and a minimum of 12 credit hours in courses numbered 600 or above must be taken. Each student in the Ph.D. program is required to take PH 792 (Physics Seminar) for three terms. Courses in addition to those enumerated above are selected in consultation with student's advisory committee. Transfer of credit from other institutions requires approval of the graduate faculty in physics. Although a minor subject is not required, student is encouraged to develop an interdisciplinary program of study.

In order to demonstrate competency in language skills, the physics department requires for each language a score of 35 percentile or better on the standardized Graduate School Foreign Language Tests provided by the Educational Testing Service. An in-depth knowledge of one language requires a score of 65 percentile or better on the ETS examination.

To be admitted to candidacy for the Ph.D. degree, student must pass the qualifying examination. A student must have earned 42 hours of graduate credit to be eligible to take the qualifying examination. After two or more years of full time graduate work or the equivalent in part-time work, the student may be required to take the qualifying examination. This examination may be taken no more than twice and tests student's fitness for pursuing a research project in his chosen area and his general knowledge of physics.

A significant portion of the dissertation must be submitted for publication in an approved journal with international circulation.

Physics (PH)

Prerequisites for physics courses listed may be waived by instructor or department chairman for auditors or students with equivalent experience.

101 General Physics 4 hrs.
Introductory course for non-science student. Phenomenological in nature with emphasis on understanding basic ideas of physics and ability to apply these ideas to specific problems. Newtonian mechanics, conservation laws, electrostatics, and currents. Laboratory included. PH 101 and 102 satisfy laboratory science requirement. Lab fee: Level 3. Prerequisite: high school algebra. Winter, summer.

102 General Physics 4 hrs.

106 General Astronomy I 4 hrs.
Introduction to astronomy and astrophysics with emphasis on quantitative aspects of physical phenomena occurring in the universe. The solar system, motion of the earth, seasons, the sun, the moon and tides. Telescope systems and their uses, positional
astronomy and navigation. Laboratory included. PH 106 and 107 satisfy laboratory science requirements. Lab fee: Level 3. Prerequisite: high school algebra and trigonometry. Fall.

107 **General Astronomy II**
4 hrs.

111 **General Physics with Calculus I**
4 hrs.
Introductory course for science and engineering students. Phenomenological and quantitative in nature with emphasis on understanding basic ideas of physics and ability to apply these ideas to specific problems. Vectors, Newtonian mechanics, energy, simple harmonic and wave motion. Laboratory included. Lab fee: Level 3. Prerequisite: PH 106. Winter.

112 **General Physics with Calculus II**
4 hrs.
Continuation of PH 111. Heat and thermodynamics, basic electricity, electric and magnetic fields, electromagnetic waves, and optics. Laboratory included. Lab fee: Level 3. Prerequisite: MA 153. Fall, winter, spring, summer.

113 **General Physics with Calculus III**
2 hrs.
Continuation of PH 111 and 112. Modern physics part of general physics sequence. Relativity, quantum effects, atomic and nuclear structure, and elementary particles. Parallel: PH 112. Fall, winter, spring.

201 **Mechanics**
3 hrs.
Galilean invariance, energy and momentum; nonrelativistic particle kinematics and dynamics; harmonic oscillator; Lorentz transformations; relativistic momentum, energy, and dynamics. Prerequisite: PH 101 or 111. Prerequisite or parallel: MA 233. Fall, spring.

241 **Waves and Oscillations**
3 hrs.
Periodic phenomena, free oscillators, forced oscillators, traveling waves, modulation, and Fourier analysis. Prerequisite: PH 201. Prerequisite or parallel: MA 244. Winter, summer.

310 **Intermediate Laboratory I**
1 hr.

311 **Intermediate Laboratory II**
1 hr.
Electronics instrumentation, electric fields, motion of charged particles. Lab fee: Level 3. Prerequisite or parallel: PH 331. Spring.

312 **Intermediate Laboratory III**
1 hr.
Electric circuits, acoustics and fluids, optics. Lab fee: Level 3. Prerequisite: PH 311. Fall.

321 **Thermal and Statistical Physics**
3 hrs.
Microscopic systems, equilibrium, heat and temperature, irreversibility, and probability and statistics. Thermal interactions, approach to equilibrium, mean energy and pressure of ideal gas. Microscopic theory, absolute temperature, entropy, canonical distribution, and equipartition of energy. Prerequisite: PH 331. Spring.
Energy Studies 3 hrs.
Techniques for estimating energy resources and energy consumption patterns. Analysis of energy losses in the automobile with practical conservation ideas. Conflicts between energy and environment, and economic and political considerations. Prerequisite: PH 102 or 113. Spring.

Electricity and Magnetism 3 hrs.
Basic concepts of electrostatics, electric potential theory, electric fields and currents, fields of moving charge including relativistic treatment, magnetic fields, Maxwell's equation. Prerequisites: PH 201, MA 251. Winter.

Electronics 4 hrs.
Introductory course for all science students. Basic AC and DC circuits, vacuum-tube circuits, transistor circuits, power supplies, feedback and their use in laboratory instruments. Laboratory included. Lab fee: Level 3. Prerequisite: PH 112. Summer.

Quantum Physics 3 hrs.
Quantum hypothesis, physical quantities, theory of measurement. Uncertainty principle, energy levels, photons, particles, de Broglie waves. Phenomenological wave mechanics, Schroedinger's wave equation, hydrogen-like systems, interactions. Prerequisites: PH 241, 331. Fall.

Intermediate Mechanics 3 hrs.
Motion of particle in two or three dimensions, central forces, gravitation, systems of particles. Rigid body motion, moving coordinate systems, generalized coordinates. Lagrange's equations, Hamilton's equations. Prerequisite: PH 201. Prerequisite or parallel: MA 352. Winter.

Optics and Spectroscopy Laboratory 1 hr.
Experiments in optics including image formation and aberrations; diffraction gratings, plane and concave grating spectrographs, photoelectric and photographic spectroscopy, analysis of spectra. Lab fee: Level 3. Summer.

Nuclear Physics Laboratory 1 hr.
Statistics in counting processes, beta-ray continuum, scintillation spectroscopy. Lab fee: Level 3. Fall.

Solid State Physics Laboratory 1 hr.
Fundamental solid state experiments including electron paramagnetic resonance, nuclear magnetic resonance, Hall effect, cyclotron resonance, Mossbauer spectroscopy. Lab fee: Level 3. Winter.

X-Ray Laboratory 1 hr.
Powder and single crystal X-ray photography with theory as needed. Lab fee: Level 3. Spring.

Senior Laboratory 1 hr.
Selected experiments from PH 412 - 415. Lab fee: Level 3. Offered upon demand.

Senior Thesis 3 hrs.
Semioriginal work performed under direction of faculty member. Lab fee: Level 4. Offered upon demand.

Intermediate Electricity and Magnetism 3 hrs.
Continuation of PH 331. Development of Maxwell's equations for time-varying fields, basic concepts of AC circuit theory, electric fields in matter, magnetic fields in matter, selected discussions on modern applications of electricity and magnetism. Prerequisites: PH 331, MA 352. Spring.
506 Introduction to Astrophysics of Stellar Systems 3 hrs.
Analysis of structure of main sequence stars; radiation theory, color-magnitude diagrams and their interpretation. Dynamics of simple and many-body systems — the restricted 3-body problem, Hamilton-Jacobi methods, Liouville's and Jean's theorems and their application to galactic structure. General relativity and application to cosmology. Prerequisites: PH 401, MA 352. Spring.

521 Thermal Physics 3 hrs.
Thermal phenomena on macroscopic and statistical basis and principles and laws governing them. Prerequisite: PH 431. Summer.

531 Introduction to Plasma Dynamics 3 hrs.

536 Introduction to Space Physics 3 hrs.
Charged particles in electric and magnetic fields, cosmic rays and trapped radiation; introduction to plasmas, including collisions and macroscopic effects. Prerequisite: PH 321, 431. Spring.

541 Optics I 3 hrs.
Geometrical optics review. Physical optics: interference, diffraction, partial coherence, polarization, interaction of radiation with matter. Prerequisite: PH 431. Fall.

551 Introductory Quantum Mechanics 3 hrs.
Background of quantum theory, wave-particle duality and uncertainty principle, basic postulates of quantum mechanics, angular momentum and spin; simple systems in one, two, and three dimensions. Perturbation theory, scattering theory, applications. Prerequisites: PH 351, 401, 431. Fall. (Same as CH 553).

552 Introductory Quantum Mechanics 3 hrs.
Continuation of PH 551. Prerequisite: PH 551. Winter. Same as CH 554.

601 Classical Dynamics I 3 hrs.

607 Mathematical Methods I 3 hrs.
Review vector calculus and coordinate systems, introduction to tensors, matrices, infinite series, complex variables with applications to calculus of residues, partial differential equations, and Sturm-Liouville theory. Prerequisite: MA 521. Fall.

609 Mathematical Methods II 3 hrs.
Orthogonal functions, Gamma functions, Bessel functions, Legendre functions, special functions, Fourier series, integral transforms and equations. Prerequisite: MA 521. Fall.

622 Kinetic Theory and Statistical Mechanics I 3 hrs.
Thermodynamics review, kinetic theory, classical statistical mechanics, canonical and grand canonical ensembles, quantum statistical mechanics, Bose and Fermi statistics, partition function. Prerequisites: PH 521, 552, MA 521. Fall.

631 Electromagnetic Theory I 3 hrs.
660  Introduction to Solid State Physics  
3 hrs. 
Crystal diffraction, reciprocal lattice-binding energies, phonons, thermal properties of insulators, free electron gas and energy bands in crystal. Prerequisite: PH 551. Winter.

680-689  Selected Topic  
3 hrs. 
Offered upon demand. Previous topics: superconductivity, optical properties of solids in infrared, laser propagation, collision theory, quantum electronics, and microwave properties of solids.

699  Master's Thesis  
3 hrs. 
Minimum of two terms required for M.S. students. Maximum of 9 hours credit awarded upon successful completion of master's thesis.

702  Classical Dynamics II  
3 hrs. 
Continuation of PH 601. Review Lagrangian and Hamiltonian dynamics, canonical transformation, Hamilton-Jacobi theory, Lagrangian field theory, selected topics. Prerequisite: PH 601. Fall.

705  Relativity  
3 hrs. 
Special and general theory. A covariant formulation of electrodynamics. Prerequisites: PH 601, 631, Spring.

711  Problems in Physics I  
3 hrs. 
Application of theoretical principles of physics to an intensive analysis and solution of representative problems. Prerequisites: PH 552, 601, 622, 631. Fall.

712  Problems in Physics II  
3 hrs. 
Continuation of PH 711. Prerequisite: PH 711. Winter.

723  Kinetic Theory and Statistical Mechanics II  
3 hrs. 
Continuation of PH 622. Advanced topics in kinetic theory and statistical mechanics. Prerequisite: PH 622. Winter, Summer.

732  Electromagnetic Theory II  
3 hrs. 
Continuation of PH 631. Inhomogeneous wave equation and sources. Special relativity, radiation from accelerated charges, and Hamiltonian formulation of electrodynamics. Prerequisite: PH 631. Summer.

741  Optics II  
3 hrs. 
Continuation of PH 541. Selected topics from advanced optics. Fresnel and Fraunhofer diffraction, theory of aberrations, theory of partial coherence including laser applications. Prerequisite: PH 541. Winter.

751  Quantum Mechanics I  
3 hrs. 
Review of basic principles, general formulation in Hilbert space, angular momentum, steady-state perturbation theory, scattering theory and applications. Prerequisites: PH 552, 601, 709. Winter.

752  Quantum Mechanics II  
3 hrs. 
Continuation of PH 751. Identical particles, symmetry principles, time-dependent perturbation theory, variational principles, formal scattering theory. Prerequisite: PH 751. Spring.

753  Quantum Mechanics III  
3 hrs. 
Continuation of PH 751 and 752. Relativistic wave equations, second quantization, interacting fields, Feynman techniques. Prerequisite: PH 752. Summer.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>760</td>
<td>Solid State Physics I</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Semiconductor crystals, superconductivity, dielectric polarization, ferroelectric crystals, diamagnetism, paramagnetism, ferromagnetism, antiferromagnetism, magnetic resonance, optical phenomena in insulators, point defects and dislocations. Prerequisite: PH 660 or equivalent. Prerequisite or parallel: PH 631. Spring.</td>
<td></td>
</tr>
<tr>
<td>761</td>
<td>Solid State Physics II</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Continuation of PH 760. Selected topics from quantum theory of solid state physics including many-body technique, transport properties, optical properties, superconductivity. Prerequisites: PH 752, 760. Fall.</td>
<td></td>
</tr>
<tr>
<td>780-789</td>
<td>Selected Topics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Offered upon demand. Previous topics: superconductivity, optical properties of solids in infrared, laser propagation, collision theory, quantum electronics, microwaves properties of solids, gravitational theories.</td>
<td></td>
</tr>
<tr>
<td>792</td>
<td>Physics Seminar</td>
<td>No credit</td>
</tr>
<tr>
<td></td>
<td>Student reports on journal articles or individual research. Prerequisite: PH 552. Two terms required for M.S. students. Fall, winter, spring.</td>
<td></td>
</tr>
<tr>
<td>795</td>
<td>Advanced Physics Project Laboratory</td>
<td>3 or 6 hrs.</td>
</tr>
<tr>
<td></td>
<td>Advanced laboratory research in one of the departmental research groups. Student works on an independent or group project. Prerequisite: approval of adviser.</td>
<td></td>
</tr>
<tr>
<td>799</td>
<td>Doctoral Dissertation</td>
<td>3, 6, 9 hrs.</td>
</tr>
</tbody>
</table>
School of Nursing

Dean: Vacant

Professor Burge, Hincker; Associate Professors Anderson, Baur, Cook, Douglas, Faller, Henze, Lloyd, Maines, Pearson, Perrin, Phillips, Reid, Warren, Williamson; Assistant Professors Appleton, Brisley, Cash, Copeland, Grisett, Heaman, Holder, Williams; Adjunct Assistant Professor Jones; Instructors Reumann; Clinical Instructor Mitchell.

The School of Nursing offers the undergraduate Bachelor of Science degree in Nursing and the Master of Science in Nursing in the graduate program. The professional components of both the undergraduate and graduate programs are designed to give the student the theoretical and experiential base for current and future practice. The undergraduate curriculum also provides general education options which foster personal development. The graduate program offers opportunity for specialization for advanced nursing practice.

The undergraduate program in Nursing is approved by the Alabama Board of Nursing. Both the baccalaureate and the masters programs in Nursing are accredited by the National League for Nursing.

Undergraduate Program

The undergraduate curriculum is divided into two components, the lower and upper divisions. Lower division courses establish the scientific base for future practice of nursing. The upper division concentrates on progressive experiences and professional nursing practice, as well as theory to support it. In addition, the student selects a cognate area of study or a minor. Graduates are prepared to accept employment in all beginning-level positions in nursing practice.

Beginning students are advised by the School of Nursing Advisement Office personnel. Continuing students are assigned an adviser from the nursing faculty and must meet with the adviser once each term for program approval before registration.
Students transferring to UAH from other institutions should seek advice from the School of Nursing at least six months before registration. The student transferring into the program in nursing has the same options of testing for credit or advanced standing as other university students (see Admissions Information). Credit for at least one-half of the major nursing courses must be earned at UAH to complete requirements for the B.S.N. degree.

Registered Nurses

Registered nurses may be admitted at an appropriate point in the undergraduate curriculum to meet requirements for the Bachelor of Science degree. A specific schedule of required courses must be pursued. Opportunities to challenge other courses in the curriculum may be discussed with student's adviser.

To be admitted to the upper division clinical core of the baccalaureate nursing curriculum, a registered nurse applicant must (1) hold a current license to practice as a registered nurse, (2) meet requirements listed below under Health Service and Responsibility to Agencies, and (3) present evidence of satisfactory work experience as a nurse for the period immediately before admission to the clinical program.

Health Service

The unique clinical experiences of students in the baccalaureate and graduate programs require a health surveillance program not applicable to other students in the university. The protection of the student's own health as well as that of the patient necessitates the following regimen before any experience in patient-care agencies:

1. Health examination by a medical physician and dentist within two months before beginning junior, senior, and graduate years. Results of the examination must be submitted on forms provided by the School of Nursing at least two weeks before registration. This information must be on file with the Coordinator of the Lower Division or the Chairman of the Graduate Program before registration.

2. Admission to patient-care agencies depends on satisfactory reports of mental and physical health. Any disability that could affect the safety of patients (i.e., impaired hearing, vision, mentation, communicable disease, etc.) is cause for termination.

3. Health insurance that covers cost of ambulatory or out-patient treatment. Hospitals and health agencies are not responsible to care for illness or injury occurring while the student is practicing there.

Undergraduate Admission, Progression, Graduation Requirements

1. Normally a student must complete all lower-division requirements outlined in the catalog under School of Nursing before being admitted to the upper-division component of the nursing major.

2. A student admitted to the upper-division major must have an overall 2.0 (C) average on all hours taken, including all course work taken at UAH and other colleges and universities.
3. No grade below C is accepted in any required natural or behavioral science course or in English composition courses.

4. No grade below C is accepted in required courses in the nursing major.

5. A student who receives a grade below C in a nursing course may repeat the course one time and is not permitted to progress to the next course unless the grade below C has been raised.

6. If a student receives two course grades below C at any time during the program in a core clinical nursing course, the student is not permitted to continue.

7. An overall 2.0 (C) average in all course work pursued as well as in all courses taken in the nursing major is required for graduation.

8. The faculty of the School of Nursing reserves the right to review a student’s progress at any time. Because of the nature of professional nursing practice, standards related to interpersonal relationships, behavior, and affect, as well as scholarship, must be assessed. Failure of a student to meet these standards is considered cause for termination.

9. Elective credits accepted toward the degree are limited for activity courses as follows: physical education -- 3; military science -- 3; music -- 2; art -- 2. No more than a total of 4 credits in any combination of these activity courses are accepted to meet graduation requirements.

10. Students must meet standards for health as stated in the catalog under the School Nursing.

11. Requests for exceptions to any requirements may be appealed to the Admissions, Progression and Graduation Committee of the School of Nursing.

Responsibility to Agencies

Students practicing in patient-care agencies must be acceptable to those agencies and are responsible for complying with policies and procedures required by the agency, including coverage by malpractice insurance when enrolled in clinical courses. Failure to meet this requirement may mean that the student is excluded from required practice and prevented from completion of the program.

Baccalaureate Program of Studies

Lower Division: 65 semester hours

<table>
<thead>
<tr>
<th>Natural Science, Mathematics, and Statistics:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological Sciences (BYS 114, 214, 313, 314)</td>
</tr>
<tr>
<td>Chemistry (CH 101, 105)</td>
</tr>
<tr>
<td>Mathematics (Level I)</td>
</tr>
<tr>
<td>(If placed at Level II or above, student may use 3 hours as an elective.)</td>
</tr>
<tr>
<td>Statistics (a statistics course offered in any department)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
</tr>
</tbody>
</table>
Social and Behavioral Sciences:
Sociology (SOC 100, 106) .......................................... 6
Psychology (PY 103, 375) .......................................... 6
Elective ......................................................... 3

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Humanities:
English composition (EH 101 and 102 or 103 and 104) .................. 6
Literature or history (two courses in sequence) ........................ 6
Human Development (ED 230) .................................... . 3
Elective ..................................... . .. . ........... . .... 3

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Nursing:
Lower division core (NUR 222, 234) .................................. 6

Upper Division: 63 semester hours
Clinical nursing core courses (NUR 361, 372, 373, 480, 481, 473) .......... 43
Introduction to Pharmacology (NUR 321) .................................. 2
Nutrition in Nursing (NUR 322) ........................................... 2
Introduction to Health Assessment (NUR 330) ............................ 3
Senior Seminar in Nursing (NUR 422) .................................... 2
Research Process in Nursing (NUR 423) .................................. 2

54

Electives:
General elective .................................................. 3
Upper division electives to complete cognate or minor .................. 6

9

Summary
A total of 128 semester hours of credit is required for the B.S.N. degree. As
specified in the program of studies, 60 semester hours of nursing constitute the
major area of concentration. Each student is guided by his assigned faculty ad­
viser to select a cognate area or a minor field consistent with his goals and
abilities.

The cognate area requires 21 semester hours of course work in two or more
disciplines designed to give the student breadth relating his major subject to
other fields of knowledge. In the cognate, 9 semester hours of upper division
courses are required, 6 of which must be taken at UAH. See requirements for
minor elsewhere under Academic Information.
Graduate Program

The School of Nursing offers the Master of Science in Nursing degree which builds upon and augments the scientific and professional base provided in baccalaureate-level study.

The graduate of this program is prepared to assume an active leadership role in the delivery of health care. The program is designed for five terms of study for the full-time student and provides both a theoretical and clinical base, enabling the graduate to engage in advanced professional practice. Upon completion of the community track, the graduate is eligible to apply for certification as a Family Nurse Practitioner at state and national levels.

Clinical experiences with an orientation to family nursing provide opportunities for the student to individualize the program by concentrating on community-based nursing or acute-care nursing. The acute-care track includes functional options of teaching or supervision; the community track has the functional option of advanced practice. Upon completion of the community track, the graduate is eligible to apply for certification as a Family Nurse Practitioner at state and national levels.

Students select either Plan I (thesis) or Plan II (professional paper) as part of the program of study. The faculty adviser assists the student in selecting required and supporting courses appropriate to his personal and professional goals.

Health Service

The health service requirements are the same as those for students enrolled in the undergraduate program.

Responsibility to Agencies

Responsibility to agencies is the same as those for students enrolled in the undergraduate program.

Admission

In addition to requirements for admission to the School of Graduate Studies, requirements for admission to the graduate program in nursing are the following:

1. Graduation from a National League for Nursing accredited baccalaureate program with a major in nursing
2. Grade-point average of 3.0 on a 4.0 scale in all undergraduate nursing courses
3. Evidence of a current license to practice as a registered nurse
4. Three letters of recommendation, preferably including one from a previous employer or supervisor and one from a previous faculty member or dean
5. One course in basic statistics
6. Successful nursing practice as evidenced by letters of recommendations
7. Personal interview when possible
Graduate Program of Studies

Core Requirements: ................................................................. Semester Hours
  Development of Nursing Theory (NUR 601) .................................. 3
  Seminar in Research (NUR 602) .................................................. 3
  Advanced Health Assessment (NUR 606) ........................................ 4
  Pathophysiology (NUR 612) ....................................................... 4
  Family in a Changing Society (DL 640) ....................................... 3
  Professional Practice Issues (NUR 641) ....................................... 2
  Family Nursing (NUR 627) ......................................................... 4

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In addition to the above 23 semester hours of required core courses, student selects one of the following options:

Option I: Acute Care with Teaching Functional Area
  Acute Care Nursing (NUR 631, 632) ........................................... 8
  Teaching Support Courses (NUR 634, 635) ................................... 6
  Teaching Practicum (NUR 636) ................................................ 3
  17

  OR

Option II: Acute Care with Supervision Functional Area
  Acute Care Nursing (NUR 631, 632) ........................................... 8
  Supervision Support Courses (AS 621, 624) ................................ 6
  Supervision Practicum (NUR 636) ............................................. 3
  17

The remaining 6-10 hours required are selected on the basis of a thesis (Plan I) for 6 semester hours or a professional paper (Plan II) for 4 semester hours plus 6 hours of electives.

Option II: Community Nursing
  Role Resocialization (NUR 640) ............................................... 2
  Community Nursing (NUR 628, 629, 630) ................................... 15
  Pharmacology in Advanced Practice (NUR 614) ................................ 3
  Family Counseling (NUR 616) ................................................ 3
  Professional Paper (NUR 603) ................................................ 4
  OR
  Thesis (NUR 699) ................................................................. 6
  27-29

Summary
A minimum of 46 semester hours is required for the Master of Science in Nursing degree. Twenty-three hours are required core courses, plus 17 to 23 hours are required for Option I or Option II. Additionally, Plan I requires 6
semester hours for the thesis; Plan II requires 4 semester hours for the professional paper plus 6 hours of electives.

Eligibility for graduate nursing courses is dependent upon admission to the School of Graduate Studies and the School of Nursing graduate program.

**Nursing (NUR)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>222</td>
<td>Introduction to Professional Nursing</td>
<td>2 hrs.</td>
</tr>
<tr>
<td>234</td>
<td>Foundations of Nursing</td>
<td>4 hrs.</td>
</tr>
<tr>
<td>321</td>
<td>Pharmacology in Nursing</td>
<td>2-3 hrs.</td>
</tr>
<tr>
<td>322</td>
<td>Nutrition in Nursing</td>
<td>2 hrs.</td>
</tr>
<tr>
<td>325</td>
<td>Human Sexuality</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>330</td>
<td>Introduction to Health Assessment</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>331</td>
<td>Nursing Care of the Person with a Long-Term Illness</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>332</td>
<td>Nursing Care of Persons Experiencing Surgical Interventions</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>333</td>
<td>Nursing Care of Acutely Ill Child through Adolescence</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>334</td>
<td>Death and Dying</td>
<td>2-3 hrs.</td>
</tr>
<tr>
<td>335</td>
<td>Family-Centered Maternal-Infant Care</td>
<td>3 hrs.</td>
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</tbody>
</table>
361 Bases of Nursing Practice

372 Nursing Process in Care of the Adult
Nursing theory and process used in caring for individuals experiencing assaults on mind-body integrity. Clinical experiences included. Lab fee: Level 7. Prerequisite: NUR 321, 322, 361.

373 Nursing Process in Care of the Developing Family
Nursing process used to promote health and facilitate adaptation in child bearing and child-rearing families. Clinical experiences in maternity, community, and pediatric settings. Lab fee: Level 7. Prerequisite: NUR 321, 322, and 361.

384 Nursing Process in Nursing Practice
A transition course for Registered Nurses designed to build upon previous background in nursing. The course of study encompasses the philosophy of baccalaureate education as it applied to the care of the child, adult, and family. Prerequisites: 1) Registered Nurse status; 2) Lower Division courses. 3) Acceptance of application; 4) NUR 330 Pre or Co-requisite. Lab fee: Level 7.

390 Independent Study
Individualized independent study of specific nursing problem under sponsorship of a nursing faculty member with special preparation in the field. Elective only. Prerequisite: NUR 361 and approval of proposal by instructor and dean.

422 Senior Seminar in Nursing
Issues, trends, and professional parameters related to practice. Concurrent with NUR 473.

423 Research Process in Nursing
Research process applied to problems in nursing as a base for evaluation of existing practice and research. Concurrent with NUR 473.

433 Nursing Care of Patients with Cardiovascular Problems
In-depth study of patients with cardiovascular problems, including clinical application of nursing process in meeting needs related to cardiovascular conditions. Elective. Prerequisite: NUR 480, 481, and approval of instructor.

435 Clinical Psychiatric Nursing
Continuing study of patients with psychiatric/emotional problems. Supplement to and expansion of theory and experiences gained in NUR 481. Expansion of applications and theoretical base of psychiatric nursing. Elective. Prerequisites: NUR 480, 481, and approval of instructor.

473 Nursing Leadership in Professional Practice

480 Nursing Process in Community Health
Nursing process used to promote health and foster adaptation in individuals, families, and communities. Clinical experiences in community agencies and settings. Lab fee: Level 7. Prerequisites: NUR 330 and senior standing.

481 Nursing Process in Acute Care Nursing

500 Special Topics
Advanced study of underlying sciences and personal experiences in application of skills in selected area of interest in nursing. Elective. Prerequisite: approval of instructor.
503 Advanced Coronary Nursing Care 3 hrs.
A course designed primarily for graduate nurses to provide in-depth knowledge of the care of the cardiovascular patient. Emphasis will be placed on normal and pathological physiology as well as the exploration of behavioral aberrations and coping mechanisms. Prerequisite: Registered Nurse or new graduate.

601 Development of Nursing Theory 3 hrs.
Seminar. Theory and theory building as explored and practiced in clinical setting. Theory building for nursing practice and its application to research in nursing.

602 Seminar in Research 3 hrs.
Identification, exploration, and critique of current nursing theory and research to encourage student to think critically. Use of theory and scientific methodology to formulate a proposal for investigation or research.

603 Professional Paper 1-4 hrs.
Application of research or investigative process with faculty guidance. Research or investigation of a nursing problem and preparation of appropriate written report. Prerequisites: NUR 601, 602, 606, 612, and 627.

606 Advanced Health Assessment 4 hrs.
Theory and laboratory practice to develop skills for comprehensive health assessment of individuals and families. Lab fee: Level 7.

612 Pathophysiology 4 hrs.
Expansion upon previous knowledge of anatomy, physiology, adaptation, and disease process. Anticipated and existing physiological alterations as they affect the individual and the family.

614 Pharmacology in Advanced Practice 3 hrs.
Advanced content in clinical pharmacology based on body systems and the physiological-biochemical relations within and between those systems.

616 Family Counseling 3 hrs.
Prepares graduate nurses to assist the family unit in dealing with crises of daily living through the analysis of the family as a system and the application of therapeutic intervention.

627 Family Nursing 4 hrs.

628 Family Nursing in Community I 4 hrs.

629 Family Nursing in Community II 4 hrs.
Advanced nursing concepts and clinical practice of health management of children in context of the family. Lab fee: Level 7. Prerequisites: NUR 628 and NUR 640.

630 Family Nursing in Community III 7 hrs.
Seminar and clinical practicum in innovative nursing management of families with complex problems. Lab fee: Level 7. Prerequisite: NUR 629.

631 Family Nursing in Acute Care I 4 hrs.
632 Family Nursing in Acute Care II 4 hrs. Continuation of concepts and theories taught in NUR 631 with additional application to practice in acute-care settings. Lab fee: Level 7. Prerequisite: NUR 631.


636 Practicum in Teaching or Supervision 3 hrs. Practicum in planning and teaching clinical nursing to selected students or directing activities of nursing personnel in selected health service settings. Lab fee: Level 7. Prerequisites: NUR 632, 634, 635, or 632, AS 621, 624.

640 Concepts of Role Resocialization 2 hrs. Seminar in leadership skills and role resocialization to enhance effectiveness of master's prepared practitioner in community health. Corequisite with NUR 628.

641 Issues in Professional Practice 2 hrs. Exploration of professional nursing's development and related social, political, and technological forces. Strategies for management and change are identified and evaluated. Corequisite with NUR 630 or 636.

650 Independent Study 2-4 hrs. The planning, implementation, and evaluation of related phenomena of special interest observed in nursing practice.

699 Thesis 1-6 hrs. Independent research investigation related to practice of nursing under faculty guidance. Prerequisite: NUR 627.
School of Primary Medical Care

Acting Dean George W. Corner, Jr., B.A., M.D., Professor of Obstetrics and Gynecology

Community Medicine
Professors Bishop (chairman), Grant; Associate Professor Roberts; Assistant Professors Banahan, III; Instructors Holland, Milan

Emergency Medicine
Clinical Assistant Professor Throckmorton (chief) (volunteer faculty); Clinical Instructor Lecturer Beck

Family Medicine
Professors Bishop, Grant; Associate Professors Banahan, Jr., Knight, Roberts; Adjunct Associate Professor Fleming; Assistant Professors Butler (chief), Hopkins, McCarthy; Clinical Assistant Professor Dellinger

Internal Medicine
Professor Sparks (chief); Clinical Professor Clabaugh; Associate Professors Boctor, Franco-Browder; Clinical Associate Professor Williams; Assistant Professor Schreeder; Clinical Assistant Professors Boyer, Hull

Medical Sociology
Professor McCalister

Microbiology
Associate Professor Moore

Obstetrics and Gynecology
Professor Corner; Associate Professor DiPlacido (acting chief); Clinical Instructors Aulds, Harris

Pathology
Clinical Associate Professor Litkenhous (chief); Lecturer Keebler
The School of Primary Medical Care of the University of Alabama in Huntsville offers courses for undergraduates interested in learning more about the health professions before entering medical school, dental school, or other health professional educational programs. The school also offers for undergraduate credit a paramedical program at the highest level of training for emergency medical technicians. Both groups of undergraduate courses are listed in this section.

The UAH School of Primary Medical Care offers professional medical training on three levels. For junior and senior medical students in the University of Alabama School of Medicine, the UAH School of Primary Medical Care offers a complete clinical education program. Through the School of Primary Medical Care, UAH jointly offers with Huntsville Hospital a three-year residency in family practice for medical school graduates who want specialized training to qualify for certification by the American Board of Family Practice. The school also sponsors or cosponsors a variety of continuing medical education conferences and workshops to aid practicing physicians in maintaining licensure and certification requirements. All three programs are accredited through the University of Alabama School of Medicine (UASOM).

All UASOM freshman students are admitted to the parent school in Birmingham, where they complete their basic medical science training, which comprises the first two years of the undergraduate medical curriculum. Students then take their clinical clerkships and electives at the Birmingham, Huntsville, or Tuscaloosa campuses. Students who satisfactorily complete the medical curriculum at any of the three campuses are awarded diplomas from the University of Alabama School of Medicine.

Address correspondence about admission to the tri-campus UASOM to: Director of Admissions, University of Alabama School of Medicine, University Station, Birmingham, Alabama 35294. Students or prospective students at UAH interested in premedical or predental baccalaureate programs are referred to the preprofessional adviser in the School of Mathematical and Natural Sciences through the Office of the Dean of the School of Mathematical and Natural Sciences.

Faculty and students of the School of Primary Medical Care are available for consultation with students interested in medicine and other health professions. Interested students are referred to the Office of Medical Student Affairs, UAH Clinical Science Center.
Goals
In accord with the mission, goals, and objectives of the UASOM, the mission of the program at Huntsville is to develop and maintain the following objectives:

1. A complete clinical program for junior and senior medical students that also demonstrates career options in primary-care disciplines.
2. Residency training programs in traditional primary-care disciplines to provide practicing physicians to meet the needs of Alabama.
3. Continuing medical education programs to provide physicians and other health-care professionals in North Alabama opportunities to stay abreast of advances in patient care.
4. Research in psychosocial and socioeconomic areas related to medicine and health care in general, as well as traditional biomedical research.
5. Ongoing patient-care services appropriate to the training of the school’s residents and medical students and the health needs of North Alabama.

In addition, the resident and student programs and the school’s continuing education programs for physicians and other professionals emphasize the following:

Undergraduate Programs (UAH)
Admissions committees of professional schools expect competitive applicants to be knowledgeable concerning their fields of interest. To this end, the School of Primary Medical Care faculty work with faculty of other schools and divisions of UAH to offer courses for preprofessional students.

The university’s emergency medical service-paramedic training program is also offered through the SPMC. Upon successful completion of the program, the student is qualified to apply for licensure as an emergency medical technician-paramedic through the state Department of Public Health.

Prehealth Studies and Emergency Medical-Paramedic Training (MED)

<table>
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<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
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<tr>
<td>100</td>
<td>Introduction to the Health Professions</td>
<td>1 hr.</td>
<td>Career options for undergraduate students interested in health professions. Basics of health-care delivery systems and terminology of health care. Primarily for freshman and sophomores. (Same as BYS 100).</td>
</tr>
<tr>
<td>191</td>
<td>Emergency Medical Technician-Basic</td>
<td>3 hrs.</td>
<td>Basic techniques of prehospital stabilization in emergencies such as traumatic injuries, cardiac arrest, and other life-threatening health conditions. (Same as HPE 191).</td>
</tr>
<tr>
<td>192</td>
<td>Emergency Medical Technician-Basic Lab</td>
<td>1 hr.</td>
<td>Laboratory course concurrent with MED/HPE 191. Application of techniques taught in MED/HPE 191 to real or simulated situations. Qualification for examination for Alabama EMT-Basic license upon successful completion of lecture and laboratory courses. Prerequisite: MED/HPE 191 or concurrent enrollment. (Same as HPE 192).</td>
</tr>
<tr>
<td>255</td>
<td>Emergency Medical Technician-Paramedic Training</td>
<td>6 hrs.</td>
<td>Training in pharmacological intervention for emergency patients as identified by the State Committee on Public Health. Instruction in drugs endorsed by the American Heart Association as essential or useful for cardiac arrest. Training in psychological first aid. Successful completion of course enables student to give advanced cardiac life support under a physician’s direction. Prerequisite: admission qualifications as specified by the UAH EMT-Paramedic Educational Advisory Board.</td>
</tr>
</tbody>
</table>
256 Emergency Medical Technician-Paramedic Laboratory 6 hrs.
Application of techniques taught in MED 255 to real or simulated situations. Successful completion of lecture and laboratory courses qualifies student to apply for the Alabama EMT-Paramedic license. Lab fee: Level 9. Prerequisite: MED 255.

401 Introduction to Clinical Medicine (Preprofessional) 3 hrs.
On-site exposure and experience in clinical settings for preprofessional student. Student works in a minimum of five clinical areas in a local hospital. Weekly lectures cover topics from human anatomy to pathophysiology of disease. Prerequisite: junior or senior status and permission of instructor.

402 Social Epidemiology 3 hrs.
Predisposing and contributory social and cultural variables in acquisition and resolution of disease in human subpopulations. Interpretative models and logic of social epidemiology and relevant concepts and methods of descriptive and analytic epidemiology. Prerequisite: sophomore status.

403 Clinical Medical Sociology 3 hrs.
Systematic analysis of problematic behaviors of patients and health professionals in the acquisition, diagnosis, treatment, and resolution of illness. General and role-specific behaviors, contexts and interaction styles as variables in problem resolution or circumvention. Prerequisite: junior or senior status.

Medical Programs (UASOM)
The medical student curriculum is determined by the School of Primary Medical Care faculty with the agreement of the Curriculum Committee of UASOM. The family practice residency curriculum is determined by the SPMC faculty in family medicine with the agreement of Huntsville Hospital and approval of the joint Residency Review Committee for Family Practice. The medical-student and resident curricula of the UAH School of Primary Medical Care are subject to change through the mechanisms described above without prior notice.

Student Medical Education
The two-year clinical program of the School of Primary Medical Care completes the qualifications of students for the M.D. degree and for taking the Part II Examination of the National Board of Medical Examiners. The special focus of the program is on general clinical competencies in medicine, pediatrics, obstetrics and gynecology, surgery, and psychiatry that qualify a student for graduate training in all disciplines. It is intended that a student completing the program will be qualified to enter an approved residency in any field of medicine.

The clinical experiences are oriented toward the primary-care emphasis on comprehensive health maintenance, behavioral medicine, continuity of care, and consideration of the family as a unit of health care. In general, both the core and elective experiences involve a combination of inpatient and outpatient assignments, the latter including clinic and private office experience. Clinical conferences appropriate to each specific core clerkship and elective are scheduled, as are ongoing conference series dedicated to primary-care emphasis of the program.

Required clerkships in the clinical program include these areas:
- Obstetrics and Gynecology
- Pediatrics
- Internal Medicine
- Surgery (General and Specialties)
- Psychiatry
- Community Medicine
- Family Medicine

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The core clerkships are based primarily in Huntsville Hospital but have several distinctive elements:

1. As part of the family medicine clerkship, every junior student is assigned to a family physician practicing in Huntsville who serves as the student’s personal mentor, adviser, and preceptor. Each student is assigned patient families to be seen in the physician-advisers’ office. Students spend one half-day weekly in their adviser’s office practices throughout the junior year with increasing responsibility for coordination and delivery of comprehensive care to their families. In some instances, a four-week block spent full-time in the adviser’s practice may be substituted for the half-day a week.

2. Every senior student spends four weeks out of five weeks required community medicine experience on a preceptorship with a primary-care physician practicing in a rural or semi-rural community in North Alabama. Students live in the community during their preceptorships and work full-time in their preceptors’ practices. The students also design and carry out studies on aspects of community health in their preceptorship locations.

3. A “Dean’s Hour” covering topics of clinical and professional importance not included in core clerkships may be held weekly throughout core clinical experience. Faculty from clinical programs as well as invited guest lecturers participate. Topics may include review of clinical and laboratory skills, social sciences in medicine, medical ethics, reviews of clinical physiology, and professional growth seminars.

Medical Student Elective Program

Clinical electives offered by the UAH School of Primary Medical Care are characterized by:

1. A one-to-one faculty-student relationship in most offerings.
2. Experience with both hospital and ambulatory patient care.
3. Experience in early diagnosis of illness.
4. Experience through private practice exposure in nonmedical aspects of health care and practice infrequently taught in formal curricula.

Electives

Clinical Elective in Cardiology
Clinical Elective in Dermatology
Clinical Elective in Gastroenterology
Clinical Elective in Infectious Disease
Clinical Elective in Medical Oncology
Clinical Elective in Nephrology
Clinical Elective in Neurology
Clinical Elective in Pulmonary Medicine
Senior Subinternship in Medicine

Clinical Elective in Ambulatory Pediatrics
Clinical Elective in Pediatric Allergy
Clinical Elective in Private Pediatric Practice
Research Elective in Clinical Immunology
Senior Subinternship in Neonatal Intensive Care
Senior Subinternship in Pediatrics
Developmental Pediatrics
Senior Elective in Obstetrics and Gynecology

Clinical Elective in Anesthesiology
Clinical Elective in Ear, Nose, and Throat
Clinical Elective in Neurological Surgery
Clinical Elective in Ophthalmology
Clinical Elective in Orthopedics
Clinical Elective in Plastic and Reconstructive Surgery
Clinical Elective in Thoracic and Cardiovascular Surgery
Senior Subinternship in General Surgery

Senior Elective in Emergency Medicine

Field Research Elective in Health Behaviors
Research Elective in Social Factors in Human Reproduction

Clinical Elective in Radiology and Nuclear Medicine
Clinical Elective in Radiation Oncology

Elective in Activities of a Public Health Agency
Elective in Patient Education
Elective in Epidemiology
Community Medicine Preceptorship
Elective in Health Care Administration
Elective in Legal Aspects of Medical Practice
Elective in International Rural Health Care
Elective in Computers and Medicine
Elective in Occupational and Environmental Medicine
Elective in Geriatrics

Clinical Clerkship in Family Medicine

Senior Elective in Clinical Pathology

During the clinical electives, student works in both hospital and office settings at the discretion of physician-supervisor, who extends graduated responsibility to student for care of private patients.

Family Practice Residency
The Family Practice Residency Program of UAH and Huntsville Hospital was the first approved residency in family practice in Alabama and the first residency program of any kind to be implemented in Huntsville. The purpose of the residency is to aid developing physicians in acquiring knowledge, skills, and attitudes necessary to become proficient family physicians and create an atmosphere in which they can provide families with comprehensive health care on a continuing basis under supervision of experienced family physicians. In acknowledgement of the need for continued medical education to maintain professional excellence, residents are encouraged to develop habits of learning and understanding that will help them assimilate current health-care information for the duration of their careers.
The residency training program is based in the UAH Family Practice Center, which is located in the UAH Ambulatory Care Center across the street from the main building of Huntsville Hospital. The Ambulatory Care Center is a microcosm of a complete primary-health-care delivery system and is an equal partner with the hospital as a base for learning.

At the beginning of the program each resident is assigned to one of the family practice modules in the Ambulatory Care Center and practices there throughout the program. Each module includes a family-practice faculty member and residents at each level of the program. In the first year residents are released from other rotations one-half day a week to see family-practice patients. The patient load increases during the second year when the residents see their patients from two one-half days a week to almost full-time, depending on the rotation to which they are assigned.

The residents begin their training program with concentrated in-hospital medicine. The first year consists of three months each in medicine, pediatrics, obstetrics and gynecology, and surgery. The medicine rotation is an intensive in-hospital experience. The pediatric rotation consists of one month of outpatient pediatrics, one month of inpatient general pediatrics, and one month of high-risk nursery experience. Obstetrics and gynecology, while basically a hospital rotation, also includes ambulatory care experience in community family planning clinics and in Ob/Gyn and Maternal Health clinics in the Ob/Gyn module of the Ambulatory Care Center. The surgery rotation is composed of two months of general surgery and one month of emergency room experience. The residents work closely with medical students on all of the core rotations.

The second and third years of the residency program emphasize ambulatory care experience. Rotations include one month each of neurology, orthopedics, cardiology, consultation medicine, dermatology, and two months of pediatrics. There is also a two-month block of general internal medicine during which the second year residents supervise and teach the first year residents and medical students.

Ten months of the second and third years are on family practice. The residents see patients in their modules six half days per week. They continue to spend three half days each week gaining experience in ENT, ophthalmology, dermatology, urology, radiology, and other mini-rotations. Psychiatry is a part of the first two month block spent on family practice in the second year.

Residents spend four months of their second and third years in electives and one month in a preceptorship with a practicing family physician in a rural community. The preceptorship provides an opportunity for actual practice under conditions similar to those that will be encountered in the resident's own practice.

Further information on the UAH-Huntsville Hospital Family Practice Residency Program is available from: Director of the Family Practice Residency, Ambulatory Care Center, 201 Governors Drive, S.W., Huntsville, Alabama 35801.
Resources and Facilities

In all aspects of its work, the UAH School of Primary Medical Care depends upon active cooperation of hospitals and medical professionals of North Alabama. Huntsville Hospital with 578 beds is the largest hospital in North Alabama and serves as the primary teaching hospital in training family-practice residents.

Ownership and operational control of the hospital are vested in the Hospital Authority of the City of Huntsville. Because of its diversified medical staff, capacity, and specialized facilities, Huntsville Hospital serves as a regional referral health care center for northern Alabama and southcentral Tennessee. Huntsville Hospital and the Clinical Science and Ambulatory Care Centers of the UAH School of Primary Medical Care form a geographic and functional nucleus for health-care education and delivery.

The UAH Ambulatory Care Center has been arranged, staffed, and equipped to facilitate demonstration of how primary physicians' office practices, consultant services, and community resources may be integrated to provide continuing comprehensive care to individuals and families. The area of the building devoted to health services on a fee-for-service basis includes a number of practice modules, each with its own examination and consultation rooms, nursing station, supply room, and waiting room. The modules are staffed by teams of faculty, residents, medical students, nurses, co-professionals, nursing students, and secretary-receptionists.

The Ambulatory Care Center also has a clinical laboratory, an ambulatory surgical unit, and a pharmacy. Patients can be referred to a clinical nutritionist or a social worker or both within the same building. The computerized business information system makes readily available accounts-receivable data for patient billings and management-systems reports.

Biomedical research is conducted in the UAH Clinical Science Center in specially designed and equipped laboratories and includes the only clinical virology laboratory in the area. The location of the school's Health Sciences Library in this building in the Huntsville medical district makes the collection conveniently available to area physicians and other health professionals as well as to medical students, residents, and faculty.

Through the UAH Library, of which it is a component, the SPMC Health Sciences Library has access to the Redstone Scientific Information Center at Redstone Arsenal. In addition, the professional staff of the Health Sciences Library works closely with library staff and services at Huntsville Hospital, the Lister Hill Library in Birmingham, the A. W. Calhoun Memorial Library at Emory University in Atlanta, and the National Library of Medicine in Bethesda, Maryland. The MEDLINE terminal in the SPMC Health Sciences Library makes available to the faculty and other members of the Huntsville medical community on-line searches through the data base of the National Library of Medicine.

The UAH Library is a member of NABIN (North Alabama Biomedical Information Network), which facilitates the rapid exchange of biomedical information among libraries and other informational units in the top tier of counties in North Alabama. NABIN interrelates with similar consortia in other areas to provide access to biomedical information resources around the world.
All medical services that the SPMC provides in educational settings for its medical students and residents are part of services provided by UAH to the region and state. The School of Primary Medical Care is one of a growing number of medical programs integrated into the life of their communities, drawing on existing facilities and professional personnel, and, in return, expanding and diversifying health services available.
## Library Research for Undergraduates

Director John Warren, B.F.A., M.L.S., Associate Professor of Bibliography.

Associate Professors Perreault, Pollard, Sharma; Assistant Professor Graham; Instructors Potter, Young.

Courses in bibliography are offered as electives only, neither forming nor contributing to a cluster; nor do they contribute to the certification requirements for teacher librarians. No credit is given toward GER.

### Bibliography (BIB)

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<td>Introduction to Library Research</td>
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<td>Organization of university libraries and their collections, use of major reference sources, and techniques of successful research.</td>
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<td>Bibliography of Business and Economics</td>
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<tr>
<td>385</td>
<td>Bibliography of Art</td>
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<tr>
<td>400</td>
<td>Theory of Bibliographical Order</td>
<td>2 hrs.</td>
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</table>
Division of Continuing Education

Director C. Michael Oliver, B.S., M.S., Ed.D., Adjunct Assistant Professor of Education

General Information

The Division of Continuing Education (DCE) is the academic unit that responds to the special educational needs of the nontraditional student. In cooperation with schools of the university, community groups, professional associations, and other agencies, the DCE offers a wide range of credit and noncredit courses, conferences, seminars, and professional development activities that supplement standard offerings of the university.

To accomplish this objective, programs in professional fields are administered through three units—Technical Studies, Management Studies, and Special Studies. A fourth unit, Community Services, administers noncredit activities in areas not allied with specific professional schools. The following sections describe services of these units.

Technical Studies

The Technical Studies' missions are to remain abreast of state-of-the-art developments in science and technology and to ensure that course offerings reflect the latest needs of the North Alabama technical community. Activities fall into three categories: (1) activities that comprise in-service training programs specifically developed to meet the needs of industrial and governmental organizations; (2) refresher courses in various scientific and technical areas; and (3) activities that disseminate technology transfer. The purpose of technical studies is to offer additional educational opportunities to groups and individuals who desire technological and scientific studies apart from or beyond degree sequences and to those with skills that require upgrading or updating.

Management Studies

The mission of Management Studies is to provide top-flight continuing education activities for business and government units in the area through sponsoring workshops and seminars. These services range from one-day sessions on specific managerial problems to sustained sequences of classes tailored for the individual needs of business organizations. They are scheduled for the convenience of the greatest number of attendees. Activities are offered
in the facilities of industrial and governmental organizations. Management Studies currently offers certificate programs in supervisory development, accounting, professional secretarial career development, human resource development and management communications.

**Special Studies**

Special Studies, in cooperation with the academic units of the university, offers credit courses to non-traditional students who cannot take advantage of the regularly scheduled courses offered at UAH.

Graduate and undergraduate courses are offered both on and off campus. Weekend college and early bird programs are two means used to serve special scheduling needs. Through the weekend college, one can earn credit toward a degree including the completion of the master's degree in administrative science. The early bird courses are offered in the morning prior to the traditional work day.

Other courses and seminars are offered for credit to meet special requirements for professional re-licensure for people in the health and teaching fields. For example, in the health field, the department plays a key role in delivering seminars and workshops for nursing professionals so that they are fully trained in advances made in their fields.

**Community Services**

This unit develops and administers noncredit activities that respond to needs of people who wish to study for personal enrichment, who want to improve their skill in an avocation or a sport, who are considering a return to school and want a noncredit transitional experience, or who need information about basic skills necessary before entering or reentering the work force. Among current offerings in Community Services are general categories of career development, personal development, women's studies, and recreation.

**Professional Development Certificate Programs**

The Division of Continuing Education in cooperation with the Schools of Administrative Sciences, Engineering, and Mathematical and Natural Sciences offers the Professional Development Certificate Program. This program is aimed at four objectives: (1) To refresh skills that are lost if not used; (2) To update professional knowledge; (3) to provide an achievement goal through completion of a coordinated, individually structured program of studies; and (4) To provide standardization of certification requirements recognizable by employers, professional societies, and licensing agencies.

The non-traditional approach taken in the program may involve not only classroom credit courses, but also selected short courses, seminars, workshops, research projects, and publications. In the areas of science and engineering, the requirements for the certificate are the satisfactory completion of ten 40-hour courses or their equivalent as determined by the candidate's adviser. Programs are flexible and are planned to meet the specific needs of the individual in such areas as microprocessor technology, environmental science, and energy studies. Other certificate programs include supervisory development, professional secretarial career development, management communication, and executive development.
Admission and Credit
Application for and admission to noncredit courses may be completed during registration. In general these courses are open to all adults, but prerequisites are necessary for certain advanced courses. Where appropriate, registrants in noncredit programs are awarded continuing education units (CEU’s). The CEU is a nationally recognized standard of measurement of participation in noncredit continuing education programs. The CEU system offers a way of helping people gain recognition for their efforts to update and broaden their knowledge and skills. It also provides a standardized unit and record system helpful in professions where continuing education is mandated, DCE maintains a permanent achievement record for all students awarded CEU’s.

Persons wishing to register for credit courses offered through DCE must be admitted to UAH as regular or special nondegree students.

Offerings Available
Some courses are given on a periodic basis, but many offerings are designed to meet current needs or interests. Consequently, offerings vary considerably with time. Brochures describing the offerings during various periods are available, and people interested in receiving these brochures should contact the Division of Continuing Education. Inquiries concerning the development of special courses are invited.

Fees
Full-term credit courses offered by DCE follow the fee schedule of UAH, and students may include these courses under the maximum fee structure that does not apply to short-term specially designed credit courses and noncredit offerings.

Other Services
Listener’s License Program
DCE, with the cooperation and participation of academic departments throughout the university, offers the Listener’s License Program to all interested individuals. The objective of this program is to make the university resources of knowledge, skill, and artistry available to all members of the surrounding community.

People this program benefits include the following:
(1) those at or approaching retirement age who desire further education in preparation for the change in themselves and their life styles
(2) those who need to acquire or maintain skills necessary to adjust to the rapidity of changes in business and professional fields
(3) younger people who will soon be choosing a career
(4) those of all ages who seek educational enrichment to increase their enjoyment of life.

Participants in the Listener’s License Program may attend selected university classes for a fee of $25 a course. They are passive participants and do not take part in class discussion or testing unless the instructor invites their participation.
Registration is through the Division of Continuing Education. A record of listener’s-licensed participants is also maintained by DCE. (No academic or CEU credit is awarded to involved participants.)

Courses attended under the Listener’s License Program cannot be challenged for credit unless full tuition for the class is paid. Participants must be at least sixteen years of age or a high school senior. Students under disciplinary or academic suspension from any college or university are ineligible to register as a listener.

Conferences

DCE provides a wide variety of conference services to assist university departments, and educational businesses, industrial, and governmental groups in setting up conferences, institutes, workshops, or special training programs.

Depending on what is required, the Division is ready to provide services ranging from routine tasks to assuming total responsibility for content development and administration of a program. The goal in coordinating each special program is to deliver a comfortable, professional setting for the conference under university auspices, striving to provide an atmosphere whereby the participants are free to focus their attention upon obtaining the maximum benefit from their experience.
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Carolyn W. White, A.B., M.A., Ph.D. .......................... Director, Academic Advisement and Information Center
Faculty

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ABBOTT, LYNNE C., B.A. (Sangamon State University), M.S.S.W. (University of Tennessee), D.S.W. (University of Alabama, Tuscaloosa). Assistant Professor of Psychiatry, 1976.

ADAMS, CURTIS H., B.S. (Mississippi State University), M.S.Ed. (Henderson State Teachers College), Ph.D. (Mississippi State University). Professor Emeritus, 1965.


ANDERSON, ELMER E., A.B. (Occidental College), M.S. (University of Illinois), Ph.D. (University of Maryland). Vice President for Academic Affairs and Professor of Physics, 1979.*

ANDERSON, GLORIA J., R.N. (Mobile General School of Nursing), B.S.N. (Indiana University), M.S.N. (University of Alabama, Birmingham). Associate Professor of Nursing, 1972.

APPLETON, PAMELA, B.S. (Mt. Saint Mary’s College), M.N. (University of California, Los Angeles). Assistant Professor of Nursing, 1978.

ARENDALE, WILLIAM F., B.S. (Middle Tennessee State University), M.S., Ph.D. (University of Tennessee). Professor of Chemistry, 1964.*

ARMOR, JERRY C., B.A. (Samford University), M.S. (Troy State University). Instructor in Criminal Justice, 1981.


AUDEH, NADEEM F., B.S. (South Dakota State College), M.S., Ph.D. (Iowa State University). Dean of School of Graduate Studies and Professor of Electrical and Computer Engineering, 1964.*

BAIRD, JAMES K., B.S. (Yale University), M.A., Ph.D. (Harvard University). Chairman of Department of Chemistry and Professor of Chemistry, 1982.

BANAHAN, BENJAMIN F., JR., M.D. (Tulane University School of Medicine). Associate Professor of Family Medicine, 1979.

BAKER, LEE C.R., A.B. (Stanford University), M.A. (University of California, Santa Barbara), Ph.D. (University of Virginia). Assistant Professor of English, 1982.

BANAHAN, BENJAMIN F., III, B.S. (Louisiana State University), M.S., Ph.D. (University of Mississippi). Assistant Professor of Community Medicine, 1980.

BARR, THOMAS A., B.S. (University of Chattanooga), M.S., Ph.D. (Vanderbilt University). Research Professor of Physics, 1982.*

BAUR, MARIAN K., B.S.N. (Emory University), M.S.N. (University of Alabama, Birmingham). Associate Professor of Nursing and Coordinator of Upper Division, 1972.


BILLINGS, C. DAVID, B.S. (Southwest Missouri State University), Ph.D. (University of Missouri at Columbia). Dean of the School of Administrative Science and Professor of Finance, 1981.
BISHOP, F. MARIAN, B.A. (Drury College), M.S. (University of Kansas), M.A.Ed. (Syracuse University), Ph.D. (Washington University), M.S.P.H. (University of Missouri). Chairman for Community Medicine Programs, Professor of Community Medicine, and Professor of Family Medicine, 1974.

BLACK, J. TEMPLE, B.S. (Lehigh University), M.S. (West Virginia University), Ph.D. (University of Illinois). P.E. Chairman of the Department of Industrial and Systems Engineering and Professor of Industrial and Systems Engineering, 1981.*


BOUCHER, PHILIP P., B.A. (University of Hartford), M.A., Ph.D. (University of Connecticut). Associate Professor of History, 1974.*

BOYER, D. ROYCE, B.M. (Butler University), M.A. (Catholic University of America), D.M.A. (University of Texas at Austin). Chairman of Music Department and Professor of Music, 1966.

BRAINERD, JEROME J., B.S., M.S., (University of Notre Dame), Ph.D. (Cornell University), P.E. Associate Professor of Mechanical Engineering, 1965.*


BROWN, JESSE C., B.A., M.A. (Jacksonville State University), Ph.D. (Southern Illinois University). Assistant Professor of Political Science, 1981.*

BROWN, ROBERT A., B.S. (U.S. Naval Academy), M.S., Ph.D. (Ohio State University), P.E. Professor of Industrial and Systems Engineering, 1967.*

BRYSON, ROSCOE E., JR., B.B.A. (Memphis State University), M.B.A., Ph.D. (Georgia State University). Coordinator of Accounting and Business Legal Studies and Associate Professor of Accounting, 1976.*

BURGE, JANET MARIE, R.N. (Hendrick Memorial Hospital), B.S. (Hardin-Simmons University), M.N. (Emory University), Ph.D. (University of Florida). Professor of Nursing and Chairman of Graduate Program, 1980.*

BUTLER, DANIEL, M.D. (University of Kentucky College of Medicine). Chief of Family Medicine Programs and Director of Family Practice Residency; Assistant Professor of Family Medicine, 1980.

BUTTS, TED M., B.S. (Mississippi State University), M.A., Ph.D. (University of Alabama, Tuscaloosa). Chairman of Education and Developmental Learning Department and Assistant Professor of Education, 1968.

CAMPBELL, P. SAMUEL, B.S. (Marietta College), M.S. (Ohio University), Ph.D. (Purdue University). Associate Professor of Biological Sciences, 1973.*

CASH, JANE E., B.S.N., M.S.N. (University of Alabama, Birmingham). Assistant Professor of Nursing, 1979.

CASTELLANO, BRUNO MICHAEL, B.S. (University of South Florida), Ph.D. (Tulane University). Assistant Professor of Mathematics, 1981.*
CHAN, CHIA HWA, B.S., Ph.D. (London University). Professor of Physics, 1970.*

CHANG, MOU-HSIUNG, B.S. (Chung-Hsing University), M.S., Ph.D. (University of Rhode Island). Associate Professor of Mathematics, 1974.*

CHANG, ROSANNA, B.A. (National Taiwan University), M.S. (Brigham Young University), Ph.D. (Oklahoma State University). Assistant Professor of Sociology, 1978.

CHEN, TSANN-HOA CHARLES, B.S. (National Taiwan University), M.A., Ph.D. (University of Georgia). Assistant Professor of Mathematics, 1981.*

CHUNG, T.J., Engineering Diploma (Seoul National University), M.S., Ph.D. (Oklahoma State University). Professor of Mechanical Engineering, 1970.*

COBLE, HAROLD DWAIN, B.S. (Kearney State College), M.S., Ph.D. (University of Nebraska). Associate Professor of Chemistry, 1966.

COFFIELD, KENNETH E., A.B. (University of Kansas), M.A. (DePaul University), M.A., Ph.D. (University of Missouri). Associate Professor of Psychology, 1966.

COMFORT, RICHARD HUGH, A.B. (Harvard University), M.S., Ph.D. (University of Alabama, Huntsville). Associate Research Professor of Physics, 1977.*


CONTRERAS, FRANK, B.M. (Millikin University), M.M. (East Carolina University), D.M.A. (West Virginia University). Assistant Professor of Music, 1977.

COOK, F. LEE, B.S., M.S., Ph.D. (Georgia Institute of Technology). Chairman of Mathematics Department and Associate Professor of Mathematics, 1967.*

COOK, JAMIE G., R.N. (Good Samaritan Hospital), B.S.N.E. (Florida State University), M.A. (Teachers College, Columbia University), Ph.D. (University of Florida). Associate Professor of Nursing, 1980.*


COPELAND, H. DONALD, R.N. (Caraway Methodist Hospital, School of Nursing), B.S.N., M.S.N. (Medical College of Georgia). Assistant Professor of Nursing, 1977.

CORMER, GEORGE W. JR., B.A. (University of Rochester), M.D., (John Hopkins University School of Medicine). Acting Dean of the School of Primary Medical Care; Professor of Obstetrics and Gynecology; Acting Associate Dean of The University of Alabama School of Medicine and Director of Medical Affairs at Huntsville, 1978.

CROMER, THOMAS L., B.A. (Colorado College), M.A., Ph.D. (University of Montana). Assistant Professor of Mathematics, 1982.*


CURRY, JAMES E., B.S., M.S. (Georgia Tech.), Ph.D. (University of Alabama, Tuscaloosa). P.E. Associate Professor of Chemical Engineering, 1981.

DAVIS, JACK H., B.S., M.S., Ph.D. (Clemson University). Associate Professor of Physics, 1966.*

DAVIS, PATRICIA E., B.A. (Baylor University), M.A., Ph.D. (Emory University). Assistant Professor of English, 1980.

FRANCO-BROWDER, SALVADOR, B.S. (University of Mexico), (National Medical School, National University of Mexico). Associate Professor of Internal Medicine, 1977.


GARSTKA, WILLIAM R., B.A. (University of California), Ph.D. (Harvard University). Assistant Professor of Biological Sciences, 1982.*


GRANT, SILAS W., B.A., M.D. (University of Texas Medical Branch at Galveston). Professor of Family Medicine and Professor of Community Medicine, 1973.

GRAVES, BENJAMIN B., B.A. (University of Mississippi), M.B.A. (Harvard University), Ph.D. (Louisiana State University). University Professor of Business Administration, 1970.*


GREENE, MICHAEL E., B.E.E., M.S. (Ohio State University), Ph.D. (Rice University). Assistant Professor of Electrical and Computer Engineering, 1982.


GRISKEY, RICHARD G., B.S., M.S., Ph.D. (Carnegie-Mellon University), P.E. Dean of School of Engineering and Professor of Chemical Engineering, 1982.*

GRISSETT, GLORIA T., R.N. (Presbyterian Hospital, Philadelphia), B.S.N. (University of Pennsylvania), M.S.N. (University of Alabama, Birmingham). Assistant Professor of Nursing, 1980.

GRZYB, GERARD J., B.A., M.A. (University of Wisconsin, Milwaukee), Ph.D. (Washington University, St. Louis). Assistant Professor of Sociology, 1977.*


HARALICK, JOY G., A.A. (Montgomery Junior College), A.B., M.A. (George Washington University), Ph.D. (University of North Carolina). Associate Professor of Sociology and Adjunct Associate Professor of Developmental Learning, 1978.

HARRIS, J. MILTON, B.S. (Auburn University), Ph.D. (University of Texas, Austin). Professor of Chemistry, 1973.*


HAY, FRANK E., B.S.E.E. (Wayne State University, Michigan), M.S.E., Ph.D. (Arizona State University). Associate Professor of Computer Science, 1982.


HAYS, DANIEL, B.A., M.A., Ph.D. (University of Missouri). Associate Professor of Psychology, 1973.*

HEAD, WILLIAM P., B.A. (Florida State University), M.A. (University of Miami), Ph.D. (Florida State University). Assistant Professor of History, 1981.

HEAMAN, DORIS, R.N. (Deaconess Hospital, Missouri), B.S.N. (University of Alabama, Huntsville), M.S.N. (University of Alabama, Birmingham). Assistant Professor of Nursing, 1977.

HELLER, HERtha D., Perm. Teachers Certificate (Teachers College for Women, Hanover, Germany), M.A. (Vanderbilt University). Associate Professor Emerita, 1965.

HENDRICKS, JOHN B., B.S. (University of Alabama, Tuscaloosa), M.S. (Southern Methodist University), Ph.D. (Rice University). Associate Research Professor of Physics, 1973.*

HENZE, REET L., B.S.N. (Gustavus Adolphus College), M.S.N. (University of Colorado). Associate Professor of Nursing, 1975.

HERMANN, RUDOLF, Ph.D. (Leipzig University), Dr. Phil habil. (Aachen Institute of Technology, Germany). Professor Emeritus, 1962.

HINCKER, ETTP ANNE, B.S. (St. Xavier College), M.S.N.E. (Catholic University of America), Ed.D. (Memphis State University). Professor of Nursing, 1979.*

HO, FAT DUEN, B.S.E.E. (South China Technological Institute, China), B.A. (Chu Hai College, Hong Kong), M.S.E.E., Ph.D., (Southern Illinois University at Carbondale). Associate Professor of Electrical and Computer Engineering, 1980.*

HODGES, H. EUGENE, A.B., M.A. (University of Georgia), Ph.D. (University of Minnesota). Associate Professor of Sociology, 1975.

HOLDER, PAMELA G., B.S.N., M.S.N. (University of Alabama, Birmingham). Assistant Professor of Nursing, 1980.

HOLLAND, MARILYN BASYE, B.A. (Scarritt College, Nashville), M.A. (George Peabody College). Instructor of Community Medicine, 1981.


HOOPER, JAMES W., B.S. (Florence State University), M.S. (Auburn University), M.S. (University of Missouri), Ph.D. (University of Alabama, Birmingham). Associate Professor of Computer Science, 1980.*
HOPKINS, JOHN B., A.B., M.A. (University of California, Davis), Ph.D. (George Peabody College). Assistant Professor of Psychology in Family Medicine, 1980.

HORWITZ, JAMES L., B.A., M.S., C.Phil., Ph.D. (University of California, San Diego). Associate Professor of Physics, 1981.*


HULL, HENRY LANE, A.B., M.A., Ph.D. (Georgetown University). Associate Professor of History, 1971.*

HUNG, RU J., B.S. (National Taiwan University), M.S. (University of Osaka), Ph.D. (University of Michigan), P.E. Associate Professor of Mechanical Engineering, 1972.*


JAMES, ROBERT E., B.S. (Carnegie Institute of Technology), M.A. (Hollins College), Ph.D. (University of Tennessee). Associate Professor of Psychology and Adjunct Associate Professor of Communication Arts, 1971.*

JOHANNES, JAMES D., B.S. (Arizona State University), M.S. (University of Alabama, Huntsville), Ph.D. (Vanderbilt University). Associate Professor of Computer Science, 1974.*

JOHNSON, CARROLL D., B.S. (University of Tennessee), M.S. (Vanderbilt University). Professor of Electrical and Computer Engineering, 1963.*

JONES, DENISE E., B.S. (University of Tennessee), M.S.A. (Georgia College). Instructor in Management, 1892.

KARR, GERALD R., B.S.A.A.E., M.S., Ph.D. (University of Illinois). Associate Professor of Mechanical Engineering, 1972.*

KHEIR, NAIM A., B.S.E.E. (Ain-Shams University, Cairo, Egypt), Ph.D. (Hungarian Academy of Science). Professor of Electrical and Computer Engineering, 1969.*

KILGO, REESE D., B.A. (University of Alabama, University), M.Ed. (University of Florida), Ph.D. (University of Texas). Associate Professor of Education, 1966.*

KIRKPATRICK, SUE W., B. Sc., M.Sc., Ph.D. (Ohio State University). Associate Professor of Human Development, 1972.

KNIGHT, PETER, M.B., B.S. (King’s College and King’s College Hospital, London University). Associate Professor of Family Medicine, 1979.

KRISHNA, KOTTEKAI, B.S. (St. Aloysius College, India), M.S. (University of Mysore, India), Ph.D. (University of Pittsburgh). Assistant Professor of Mathematics, 1983.*


LASSEIGNE, ELTON, C., B.B.A., J.D. (Tulane University), C.P.A. Professor of Legal Environment, 1982.

LAWTON, ROBERT O., B.S. (Duke University) Ph.D. (University of Chicago). Assistant Professor of Biological Sciences, 1980.

LEDBETTER, JOEL C., B.S. (Auburn University), M.D. (University of Alabama School of Medicine). Assistant Professor of Pediatrics, 1982.

LIU, FRANK C., B.S.M.E. (National Chekiang University), M.S.M.E. (University of Washington), Ph.D. (University of Texas). Professor of Mechanical Engineering, 1967.*

LLOYD, MARY A., R.N. (University of Tennessee), B.S.N., M.Ed. (University of Florida). Associate Professor of Nursing and Coordinator of Lower Division, 1972.

LOO, BOON, B.S., M.S. (University of Wellington, New Zealand), M.A., Ph.D. (University of Illinois). Von Braun Fellow and Assistant Professor of Chemistry, 1982.

MACDOUGALL, JOHN J., B.A. (Boston College), B.S. (Georgetown School of Foreign Service), M.S. (Massachusetts State College), M.A., Ph.D. (University of Michigan). Associate Professor of Political Science, 1975.


MARCUS, NORMAN, (Fellow British Institute of Management), (Member of the Institute of Marketing), London, England. Visiting Professor of Marketing, 1982.

MARR, JAMES D., B.E.E., M.S.E.E., Ph.D. (Georgia Tech University). Assistant Professor of Electrical and Computer Engineering, 1980.*

MARTIN, CARTER W., B.A. (Presbyterian College), M.A., Ph.D. (Vanderbilt University). Chairman of English and Communication Arts Department and Professor of English, 1965.*

MCALISTER, DONALD B., A.B. (Fresno State College), Ph.D. (University of Tennessee). Director of Medical Student Affairs and Professor of Medical Sociology, 1972.

MCARthy, MICHAEL J., B.S. (Franklin and Marshall College), M.D. (University of Tennessee College of Medicine). Clinical Assistant Professor of Family Medicine, 1977.

MC KNIGHT, WILLIAM B., B.S. (Purdue University), Ph.D. (Oxford University). Research Professor of Physics, 1974.*


MEEHAN, EDWARD J., JR., B.S. (Birmingham Southern College), Ph.D. (University of Alabama, Birmingham). Assistant Professor of Chemistry and Adjunct Assistant Professor of Biological Sciences, 1978.*

MEEK, ROY L., B.A., M.A. (University of Oklahoma), Ph.D. (University of Oregon). Dean of School of Arts, Humanities, and Social Sciences and Professor of Political Science, 1981.

MILAN, SHERRY D., B.A. (Smith College), M.S.P.H. (University of North Carolina, Chapel Hill). Instructor in Community Medicine, 1981.


MODLIN, RICHARD F., B.S., M.S., (University of Wisconsin, Milwaukee), Ph.D. (University of Connecticut). Associate Professor of Biological Sciences, 1976.*

MOHADJER, MAHMoud, M.S.E.E. (University of Tehran), M.S. (University of Manchester), Ph.D., (University of Alabama, Huntsville), Assistant Professor of Electrical and Computer Engineering, 1982.
MONTGOMERY, JOHN R., B.S. (University of Alabama, Tuscaloosa), M.D. (Medical College of Alabama). Chief of Pediatric Programs, Professor of Pediatrics, and Adjunct Professor of Immunology, 1975.

MOORE, BOBBY G., B.S., M.S., (Mississippi State University), Ph.D. (Auburn University). Associate Dean of School of Primary Medical Care, Associate Professor of Microbiology, Adjunct Associate Professor of Biological Sciences, Assistant Dean of the University of Alabama School of Medicine, 1979.


MORALES, CLAUDIO, B.A. (University of Chile), M.S., Ph.D. (University of Iowa). Assistant Professor of Mathematics, 1982.*

MUNSON, WILLIAM F., B.A. (Oberlin College), M.A., Ph.D. (Yale University). Associate Professor of English, 1974.*


OLSEN, RICHARD C., B.S. (University of Southern California), M.S., Ph.D. (University of California, San Diego). Assistant Professor of Physics, 1982.

O'NEAL, ROBERT D., A.B. (Florida State University), M.A. (University of New Mexico), Ph.D. (Florida State University). Associate Professor of Spanish, 1967.

OSTERMANN SONJA J., B.A. (Jacksonville State University), M.A. (University of South Carolina). Instructor in Accounting, 1979.

PACIESAS, WILLIAM S., B.S. (Seton Hall University), M.S., Ph.D. (University of California, San Diego). Assistant Research Professor, 1982.


PAUL, CHRIS W., II, B.S. (Southwest Missouri State University), Ph.D. (Texas A&M University). Associate Professor of Economics, 1982.

PEARSON, BONNIE C., R.N. (St. Joseph School of Nursing), B.S., M.Ed. (University of Minnesota). Associate Professor of Nursing, 1974.

PERRIN, MARJORIE M., B.S.N. (Medical College of Virginia), M.S.N. (University of Alabama, Birmingham). Ed.D. (Peabody College of Vanderbilt University). Associate Professor of Nursing, 1973.*
PHILLIPS, MARGARET N., R.N. (Middletown Hospital School for Nurses), B.A. (University of Alabama, Huntsville), M.S.N. (University of Alabama, Birmingham). Associate Professor of Nursing, 1973.

POLGE, ROBERT J., Ingenieur E.S.E. (Ecole Superieure d'Electricite de Paris, France), M.S.E.E., Ph.D. (Carnegie Institute of Technology). Chairman and Professor of Electrical and Computer Engineering, 1963.*


POPE, RICHARD C., B.A., M.A. (University of Louisville). Associate Professor of Art, 1966.


RAND, MYRTON C., B.S., M.S., (University of Wisconsin), Ph.D., (Rutgers University). Professor of Environmental Science, 1980.

RANGANATH, HEGGERE S., B.S.E. (Bangalore University, India), M.S. (University of Louisville), M.S.E. (Birla Institute of Technology and Science), Ph.D. (Auburn University). Assistant Professor of Computer Science, 1982.*

REES, PEMBROKE, B.S. (University of North Carolina), M.S. (Georgia Institute of Technology), M.D.S., Ph.D. (Georgia State University). Assistant Professor of Management, 1978.*


REUMANN, MARY JANE, R.N. (Presbyterian Hospital, Pittsburgh), B.S.N., M.S.N. (University of Alabama, Huntsville). Instructor in Nursing, 1980.

RILEY, CLYDE, B.S. (University of Rochester), Ph.D. (Florida State University). Professor of Chemistry, 1967, *

RITCHEY, HARDIN M., A.B. (University of Missouri), B.S., M.D. (University of Illinois). Chief of Psychiatry Programs and Professor of Psychiatry, 1974.

ROACH, CAROL A., B.A. (McNeese State College), M.A. (Texas Women's University), M.A. (University of Alabama, Tuscaloosa), Ph.D. (North Texas State University). Assistant Professor of Communications Arts, 1967.

ROACH, MERLE D., B.S. (Livingston State College), M.S. (North Texas State College, Ph.D. (University of Alabama, Tuscaloosa). Associate Professor of Mathematics, 1966.


ROBERTS, M. DIANE, B.S., M.S. (Mississippi State University, Starkville), Dr. P. H. (University of Texas School of Public Health, Houston). Associate Professor of Community Medicine and Family Medicine, 1978.

ROGERS, JON G., A.B. (Kansas State Teachers College), M.A. (University of Arkansas), Ph.D. (University of New Mexico). Professor of Psychology, 1968.*

RUSH, JOHN EDWIN, JR., B.S. (Birmingham-Southern College), Ph.D. (Vanderbilt University). Associate Professor of Physics, 1967.*

SCHOENING, NILES C., A.B. (Columbia University), M.C.P. (Ohio State University). Director of the Center for High Technology Management and Economic Research and Assistant Professor of Economics, 1983.

SCHREEDER, MARSHALL T., B.I.E. (Georgia Institute of Technology), M.D., M.P.H. (Tulane University Medical School). Assistant Professor of Internal Medicine, 1979.

SCHROEDER, EDWARD A., IV, B.S. (California Institute of Technology), Ph.D. (University of California, Los Angeles). Assistant Professor of Economics, 1982.


SHANNON, ROBERT E., B.S. (Oklahoma State University), M.S. (University of Alabama, Tuscaloosa), Ph.D. (Oklahoma State University). Professor of Industrial and Systems Engineering, 1965.


SHERMAN, J. DANIEL, B.S. (University of Iowa), M.A. (Yale University). Assistant Professor of Management, 1981.


SHIH, CORNELIUS C., B.S. (National Taiwan University), M.S., Ph.D. (Michigan State University) P.E. Professor of Mechanical Engineering, 1965.*

SHIVA, SAJJAN G., B.E. (Bangalore University, India), M.S.E.E., Ph.D. (Auburn University). Chairman of Computer Science Department and Associate Professor of Computer Science, 1978.*


SIEGRIST, KYLE T., B.S., M.S., Ph.D. (Georgia Institute of Technology). Assistant Professor of Mathematics, 1980.*

SLATER, PETER JOHN, B.S. (Iona College), M.S., Ph.D. (University of Iowa). Associate Professor of Mathematics, 1981.*

SMALLEY, BILL, B.S., M.S., Ph.D. (University of Indiana). Assistant Professor of Mathematics, 1981.*

SMITH, JAMES E. JR., B.S., Ph.D (University of South Carolina). Assistant Professor of Chemical Engineering, 1982.*

SPARKS, J. ELLIS, M.D. (Medical College of Alabama). Chief of Internal Medicine Programs and Professor of Internal Medicine, 1974.


SPIILMAN, LAVINIA W., B.S. (University of Arkansas), M.S. (Purdue University). Instructor in Mathematics, 1982.
STROMECKY, OSTAP, M.A. (Vanderbilt University), Ph.D. (Universitas Libera Ukrainensis, Pragensis). Chairman of Foreign Languages and Literatures Department and Assistant Professor of Slavic Languages, 1967.

SULLINS, WALTER R., A.B. (Stetson University), B.D. (Southern Baptist Seminary), M.A., Ph.D. (Emory University). Chairman of Psychology Department, Acting Chairman of Sociology Department, and Associate Professor of Psychology, 1966.

SUNG, CHI-CHING, B.A. (National Taiwan University), Ph.D. (University of California, Berkeley). Professor of Physics, 1972.*

TARTER, DONALD E., B.S. (Middle Tennessee State College), Ph.D. (University of Tennessee). Associate Professor of Sociology, 1966.


WAAGEN, CHRISTOPHER L., B.A. (State University of New York, Albany), M.A., Ph.D. (Pennsylvania State University), Assistant Professor of Communication Arts, 1982.

WALKER, JACK R., B.S. (Mississippi State University), M.S. (Georgia Institute of Technology), Ph.D. (Oklahoma State University), P.E. Associate Professor of Industrial and Systems Engineering, 1982.

WALLACE, DONALD B., B.S., M.S., Ph.D. (University of Wisconsin) P.E. Associate Professor of Mechanical Engineering, 1974.*

WARREN, IRIS, R.N. (Georgia Baptist Hospital), B.S.N. (Louisiana State University), M.S.N. (University of Alabama, Birmingham). Associate Professor of Nursing, 1973.

WARREN, JOHN, B.A.F.A. (Carnegie Institute of Technology), M.L.S., and advanced Masters in Library Science (University of Pittsburgh). Director of Library and Associate Professor of Bibliography, 1975.


WELSTEAD, STEPHEN T., B.S. (Notre Dame), M.S. (SUNY, Stony Brook), Ph.D. (Purdue University). Assistant Professor of Mathematics, 1982.*

WHARRY, RHODA E., B.S.E. (University of Arkansas), M.S. (Memphis State University), Ph.D. (Purdue University). Professor of Education, 1967.*

WHEELER, PETER, J.H, B.A., M.A. (Edinborough University, Scotland). Assistant Professor of Art, 1982.


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WILLIAMS, LEE E., II, B.A. (Knoxville College), M.A. (East Tennessee State University), Ph.D. (Mississippi State University), Associate Professor of History, 1972.*

WILLIAMS, LINDA K., B.S.N. (Alderson-Broaddus College), M.S.N. (Ohio State University). Assistant Professor of Nursing, 1980.

WILLIAMS, MARY ELIZABETH, A.A. (Armstrong State College), A.B. (Georgia Southern College), M.A. (Western Carolina University), Ph.D. (University of Georgia). Assistant Professor of English, 1980.

WILLIAMS, THOMAS J., B.S.Ed., M.Ed., Ph.D. (University of Georgia). Chairman of Political Science and Criminal Justice Department, Associate Professor of Political Science, 1980.*

WILLIAMSON, JOAN, R.N. (Birmingham Baptist Hospital), B.S.N. (University of Alabama, University), M.S.N. (University of Alabama, Birmingham). Associate Professor of Nursing, 1973.

WILSON, HAROLD J., B.S. (Alabama A&M University), M.S. (Iowa State University), Ph.D. (University of Arizona). Chairman of Biological Sciences Department and Professor of Biological Sciences, 1972.*


WU, SHI TSAN, B.S. (National Taiwan University), M.S. (Illinois Institute of Technology), Ph.D. (University of Colorado). Professor of Mechanical Engineering and Adjunct Professor of Physics, 1967.*

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Lecturers

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ALTGILBERS, LARRY L., B.S. (Northeast Missouri State University), M.S. (University of Alabama, Huntsville). Assistant Professor of Chemistry, 1982.


AYERS, ORVAL E., B.A. (Berea College, Kentucky), M.S. (Auburn University), Ph.D. (University of Alabama, Huntsville and University of Alabama, Tuscaloosa). Associate Professor of Chemistry, 1981.


BELL, NORMA, B.S. (University of Kansas), M.A. (George Peabody College). Adjunct Instructor in Developmental Learning, 1980.


BERG, ERNESTINE H., B.S. (Western State University, Bowling Green), M.D. (University of Louisville School of Medicine). Clinical Associate Professor of Surgery - Anesthesiology, 1977.

BILL, T.C., A.A. (College of San Mateo), A.B. (Occidental College), M.S. (Troy State University), Adjunct Instructor in Criminal Justice, 1982.

BILLIONS, GARY L., B.S. (University of North Alabama). C.P.A. Adjunct Assistant Professor of Accounting, 1976.


BOWDEN, CHARLES M., B.S. (University of Richmond), M.S. (University of Virginia). Assistant Professor of Physics, 1971.


BOYER, LYNN B., B.S. (University of Mississippi), M.D. (University of Mississippi School of Medicine). Clinical Assistant Professor of Internal Medicine - Neurology, 1979.


Chang, ANNE, B.A. (University of Alabama, Huntsville), J.D. (University of Alabama, Tuscaloosa). Assistant Professor of Business Legal Studies, 1981.

Charernkavanich, DUSIT, B.S. (Prasornmitr College, Thailand), M.S. (National Institute of Development Administration, Thailand), Ph.D. (University of Georgia). Assistant Professor of Computer Science, 1981.


Clabaugh, WEST A., B.S., M.S., M.D. (University of Oklahoma College of Medicine). Clinical Professor of Internal Medicine — Dermatology, 1974.


DAVIS, BERVIL D., B.S.E.E. (University of Alabama, Tuscaloosa), M.P.A., Ph.D. (University of Oklahoma). Adjunct Associate Professor of Management, 1976.

DAVIS, CARL G., B.A.E. (Georgia Tech), M.S.A.E., M.S.M.H., Ph.D. (University of Alabama, Tuscaloosa). Adjunct Associate Professor of Computer Science, 1982.

DIXON, STANLEY T., B.S., M.S. (Wichita State University), Ph.D. (New Mexico State University). Associate Professor of Mathematics, 1982.

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DOWDY, JAMES F., B.S., M.P.A. (University of Denver). Adjunct Assistant Professor of Political Science, 1965.


EDISON, ROBERT L., B.S., M.S. (Tennessee Institute of Technology) 1979.

EPSY, PATRICK N., B.S. (University of Alabama, Tuscaloosa), M.S., Ph.D. (University of Arkansas). Lecturer in Mathematics and Physics, 1975.

ESSENWANGER, OSKAR, B.S. (Technical University, Danzig), Diploma in Meteorology, (University of Vienna), Sc.D. (University of Wurzburg). Adjunct Professor of Environmental Science, 1971.


FENNELLY, ALPHONSUS J., B.A. (Manhattan College), M.A., Ph.D. (Yeshiva University). Associate Professor of Physics, 1980.

FISHMAN, GERALD J., B.S. (University of Missouri), M.S., Ph.D. (Rice University). Professor of Physics, 1978.


FOWLER, BRUCE W., B.S. (University of Alabama, Tuscaloosa), M.S. (University of Illinois), Ph.D. (University of Alabama, Huntsville). Associate Professor of Physics, 1978.

FURST, MONA L., B.A. (Jacksonville State University), J.D. (Cumberland School of Law). Lecturer in Criminal Justice, 1982.


GIERE, ALBERT C., B.S. (University of Pittsburgh), M.S. (University of New Mexico), Ph.D. (Pennsylvania State University). Associate Professor of Physics, 1979.

GILFORD, ROBERT G., B.M. (University of Cincinnati), M.M. (Catholic University of America). Instructor in Music, 1982


GUINN, GERALD, B.S. (Auburn University), M.S. (Purdue University), Ph.D. (University of Alabama, Tuscaloosa). Adjunct Associate Professor of Mechanical Engineering, 1967.


HAMNER, RICHARD M., B.S., M.S., Ph.D. (University of Alabama, Tuscaloosa) 1981.

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HARRISON, JOHN W., B.A. (University of Alabama, Huntsville), J.D. (University of Alabama, Tuscaloosa). Assistant Professor of Business Legal Studies, 1977.

HAYNES, JAMES F., B.A. (Millsaps College), M.S. (Alabama A&M University), Ph.D., Social Studies Education (Vanderbilt University). Assistant Professor of Economics, 1978.


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HUGHES, CUTTER, A.B. (Davidson College), J.D. (University of Virginia), LL.M. (University of London). Adjunct Assistant Professor of Communication Arts, 1978.

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KRAMER, RICHARD D., B.A.E. (Auburn University), M.S.E. (University of Alabama, Tuscaloosa), Ph.D. (University of Alabama, Huntsville), 1982.

KROES, ROGER L., B.S., M.S. (Marquette University), Ph.D. (University of Missouri). Assistant Professor of Physics, 1980.


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MC MILLAN, CHARLES E., B.S. (Knoxville College), M.S., Ph.D. (Atlanta University). Lecturer in Nursing, 1980.

MC NIDER, RICHARD T., B.S. (University of Alabama, Tuscaloosa), M.S. (Florida State University), Ph.D. (University of Virginia). Adjunct Assistant Professor of Environmental Science, 1982.


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MODLIN, PAMELA S. B.S. (University of Alabama, Huntsville). Instructor in Biological Sciences, 1982.


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PARNELL, THOMAS A., B.S., M.S., Ph.D. (University of North Carolina). Assistant Professor in Physics, 1968.

PAPADOUPOLOS, JAMES, G., B.S. (Massachusetts Institute of Technology), M.S. (Southern Methodist University), 1981.

PARKER, ROBERT, B.S. (Iowa State University), M.S., Ph.D. (Penn State), 1981.


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PATTERSON, WILLIAM J., B.S., M.S. (Mississippi State University), Ph.D. (University of Alabama, Tuscaloosa). Assistant Professor of Chemistry, 1977.


PERRY, DONALD, B.S. (University of Alabama, Tuscaloosa), C.P.A. Instructor in Accounting, 1981.

PETERS, PALMER N., B.S., Ph.D. (University of Tennessee). Professor of Physics, 1969.

PETTY, ARLEN D., B.S., M.A. (University of Alabama, Tuscaloosa). C.P.A. Adjunct Assistant Professor of Accounting, 1972.


PLEXICO, LARRY, B.S. (Auburn University), M.S., Ph.D. (University of Alabama, Huntsville), 1982.

PLOUSSARD, JOHN H., B.S., M.D. (St. Louis University). Clinical Associate Professor of Pediatrics, 1975, 1976.

POPE, DAVID J., B.S. (Auburn University), 1981.


RANDALL, JOSEPH L., B.S., M.S., Ph.D. (University of Alabama, Tuscaloosa). Associate Professor in Physics, 1960.

RAO, D. RAMKISHAN, B.V.SC. (A.P. Agricultural University, India), M.S., Ph.D. (Auburn University). Associate Professor of Biological Sciences, 1978.


RICE, HORACE W., B.A. (Alabama A&M University), J.D. (University of Toledo College of Law). Adjunct Assistant Professor of Political Science, 1976.


ROBERTS, THOMAS G., A.A. (Armstrong College), B.S., M.S., (University of Georgia), Ph.D. (North Carolina State University). Associate Professor of Physics, 1980.

ROBESON, VERNON, B.S.M.E. (University of Nebraska), 1978.


SANDHU, GURMEJ, B.S. (Punjab University), M.S. (Illinois Institute of Technology), Ph.D. (University of Alabama, Huntsville). Lecturer in Electrical and Computer Engineering, 1980.


SCHROER, BERNARD J., B.S. (Western Michigan University), M.S. (University of Alabama, Tuscaloosa), Ph.D. (Oklahoma State University). Adjunct Professor of Environmental Science, 1977.
SCHUMANN, J. PAUL, B.A., M.A. (University of Mississippi), Ph.D. (University of Oklahoma). Lecturer in Political Science, 1981.

SCHUTZENHOFER, LUKE, B.S.A.E., (St. Louis University), M.S.E. (University of Alabama, Huntsville), Ph.D., (University of Alabama, Tuscaloosa), 1972.


SELAH, CHARLES E., B.S. (University of Oklahoma), M.D. (Tulane University School of Medicine). Clinical Associate Professor and Chief of Surgery Programs, 1975.


SHEA, DANIEL E., B.S. (University of Alabama, Huntsville). Instructor in Biological Sciences, 1980.


STERN, HENRY E., B.E. (Tulane University), Ph.D. (University of Tennessee) Ph.D. (I.E and E.E) University of Alabama, Huntsville), Lecturer in Electrical and Computer Engineering and Associate Professor of Mathematics, 1982.

STEWART, ROBERT E., B.S., M.D. (University of Tennessee). Clinical Associate Professor of Pediatrics, 1975.


STUHLINGER, ERNST, Ph.D. (Tubingen, Germany). Adjunct Professor of Physics and Environmental Science, 1976.

SUTHERLIN, JERRILEE, B.A. (University of Texas, Austin), J.D. (Indiana University School of Law, Indianapolis). Assistant Professor of Business Legal Studies, 1979.

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TEMPLE, CRISTA L., B.A. (University of Alabama, Huntsville). Instructor in German, 1980.

THOMAS, DOYLE, B.S.M.E. (Texas A&M University), M.S.E. (Purdue University), Ph.D. (University of Alabama, Huntsville). Assistant Professor of Management, 1982.


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WILLIAMS, ROBERT H., A.B. (Miami University, Ohio), M.D. (University of Alabama School of Medicine). Clinical Associate Professor of Internal Medicine, 1981.


WORKMAN, CAROL Y., B.S. (University of Rochester), M.S. (University of Alabama, Huntsville), Ph.D. (Southeastern Institute of Technology). Instructor in Chemistry and Environmental Science, 1982.

WORKMAN, GARY L., B.S. (College of William and Mary), Ph.D. (University of Rochester). Lecturer in Physics, 1975.

YARBROUGH, LEONARD, B.E.E. (Auburn University), M.S.I.E. (University of Alabama, Tuscaloosa), Ph.D. (Oklahoma State University). Associate Professor of Management, 1981.


Volunteer Faculty

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ALISON, W. EVANS, M.D. (Tulane University School of Medicine). Obstetrics and Gynecology.

ANDERSON, HENRY L., JR., B.S., M.D. (Tulane University School of Medicine). Internal Medicine.


ARRINGTON, THOMAS H., B.S., M.D. (Harvard Medical School). Internal Medicine.

BAIRD, ROBERT L., M.D. (Louisville State University School of Medicine). Clinical Assistant Professor of Surgery - Colon and Rectal Surgery.

BAKER, GRADY L., M.D. (University of Louisville School of Medicine). Family Medicine.

BEARD, GRAHAM E., (Colonel, U.S. Army), B.A., M.D. (University of Louisville School of Medicine). Clinical Associate Professor of Pediatrics.
BELL, WILLIAM H., III, B.A., M.D. (University of Tennessee College of Medicine). Clinical Associate Professor of Surgery - Neurosurgery.

BESS, BARTLEY, Ph.D. (Texas Tech University). Psychiatry - Clinical Psychology.

BLACK, J. KENDALL, B.S., M.D. (Medical College of Alabama). Clinical Assistant Professor of Surgery - Orthopedics.

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CARUSO, P. MICHEAL, B.A., M.D. (University of Alabama School of Medicine). Internal Medicine.

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For Further Information

Address the following offices at: Huntsville, Alabama 35899

Admissions, Catalog Requests, Academic Information, Transcripts
Office of Admissions and Records
(205) 895-6210

General Information, Campus Tours, Services for Prospective Students
Office of Pre-Admission Services
(205) 895-6670

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Division of Continuing Education
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Office of Financial Aids
(205) 895-6241

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Division of Student Affairs
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All Other Information
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