1981

1981-1983 Catalog

University of Alabama in Huntsville

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UAH CATALOG
1981-1983

The University
Of Alabama
In Huntsville
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This catalog intends to reflect information current at the time of publication about the facilities, programs, requirements, and regulations 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

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Tuesday, Thursday

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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

## Calendar 1981-1982

### FALL

#### September

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### SPRING

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### SUMMER

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### Note:

- **A**: Application Deadline
- **B**: Beginning of Classes
- **C**: Commencement
- **S**: Study Day

# Academic Calendar 1981-1982

## Fall Term

<table>
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<td>Placement Tests</td>
<td>June 25, July 2, 9 August 6, 13 and 27</td>
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## Winter Term

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<td>NEAS</td>
<td>National Engineering Aptitude Search</td>
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<tr>
<td>NTE</td>
<td>National Teacher Examination</td>
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<td>QPA</td>
<td>Quality Point Average</td>
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<tr>
<td>SER</td>
<td>Student Eligibility Rating</td>
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<tr>
<td>TOEFL</td>
<td>Test of English as a Foreign Language</td>
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</table>
Statement of Purpose

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 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 peaceably 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.
The University of Alabama in Huntsville (UAH) is a part of the University of Alabama System. In June 1960, 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, Humanities and Behavioral Sciences, Science and Engineering, 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 credit and 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.
Facilities

The 337-acre UAH campus is in northwest Huntsville adjacent to Research Park. The thirteen campus university buildings, all of which have been constructed since 1960, contain modern equipment and exemplify modern functional design. The ten-acre medical campus is in the downtown medical district and provides two modern buildings for medical education and patient health care.

Morton Hall houses classrooms and offices for the School of Administrative Science, classrooms and offices for the behavioral sciences, office of the School of Humanities and Behavioral Sciences, the Division of Student Affairs, the Office of Admissions and Records, the Academic Advisement and Information Center, and the General Information Center.

The Science Building contains classrooms and laboratories for programs in biological, environmental, and physical sciences and offices for some of the faculty in the School of Science and Engineering. The building has modern laboratory equipment including a penthouse containing a live animal room and greenhouse.

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, now a three-story, two-building unit, is the second phase of a library complex that will form the center of a cluster of academic buildings projected for the campus. Capacity of the library is approximately 300,000 volumes. The library has open-access stacks and student typing equipment. Services of subject specialists are available for students and faculty.

Madison Hall contains executive administrative offices, graduate classrooms, the Office of Graduate Studies, and the Departments of Mathematics and Education.

The Research Institute houses offices for some of the faculty in the School of Science and Engineering, laboratory space and equipment to support experimental research in engineering, classrooms, the office of the School of Science and Engineering, and the university computer facility.

The two-story UAH Union has facilities for dining, sports, assemblies, dramatic presentations, and other recreational activities. It also contains meeting rooms, offices for the student government association and student newspaper, and a bookstore.
The Humanities Building, a two-building complex, has programs in 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 is a contemporary triangular building of 46,000 square feet. Its four levels have administration and faculty offices, classrooms, service areas, and the large 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 the Director of Alumni Affairs and Job Placement, the University Press, and the Paramedic Program.

The Marion Beirne Spragins Hall has classrooms and offices for Health and Physical Education and Athletic Department faculty and staff, a 2,800-seat gymnasium, a swimming pool, handball courts, and other physical education and recreational facilities.

The Clinical Science Center downtown 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 and continuing-medical education programs. It also contains classrooms, faculty offices, research laboratories, and the national office of Alpha Epsilon Delta, the undergraduate honorary society for students preparing for training in health professions.

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.

**Instructional Media Services**

A comprehensive program of audiovisual services complements instruction. The faculty may select from a variety of instructional aids to enrich their teaching efforts. The instructional media service lends and operates a wide variety of equipment, produces video tape presentations, prepares slides and transparencies, and directs faculty members to rental sources of recordings, slides and tapes from leading universities.

**University Housing**

The university owns 88 two-and three-bedroom apartment units within walking distance of the campus. Beginning in the fall of 1981, on-campus residence halls will be available for full-time single students, handicapped students, and married students without children. The new on-campus residence halls will consist of one-bedroom efficiency apartments for married and handicapped students and three-bedroom suite apartments for six single students. Assignments are made on the basis of application date. Students interested in university housing should apply at least one academic term before enrolling.
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. The house is available for receptions, conferences, luncheons, parties, and workshops. The faculty, staff, students and community are encouraged to utilize this gracious facility.
Physics Laboratory
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. Apply for admission well in advance of the date of proposed entrance but not more than one calendar year. 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 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, catalogs, and information brochures are available at the Office of Admissions and Records in Morton Hall.

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 to UAH 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 in 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 Science and Engineering strongly recommends that the additional elective units include two units of college preparatory mathematics. Applicants who plan to major in engineering or major 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 and 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 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 0.5 average on a 3.0 system or who has passed at least half of the work attempted 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 average on all work attempted in order to qualify for unconditional admission.
An applicant with less than an overall C average on 18 semester hours or more of work may be admitted as a regular student on probation upon recommendation of the dean of the school in which he plans to major if the quality point average is at least 0.75 (1.0 = C) and the quality point deficiency is less than 8.

**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. 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. If a student transfers from a junior college and has previous credits from a senior college, his credits will be evaluated on an individual basis and may be limited to a maximum of 64 hours to 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.

**Application Procedure for Transfer Students**

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.

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.

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, GRE 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 re-apply 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

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 Foreign Students

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

Admission Requirements

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.)
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 a university-approved health insurance coverage. Proof of continued coverage must be presented by 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 foreign student adviser at their previous school. Transfer students must have completed the equivalent of one academic term at those institutions before admission to UAH.

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 a 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.
Financial Information

Term Expenses*

Students taking 9 to 12 semester hours
(undergraduate) ........................................ $322.00
plus $30.00 per semester hour for each hour over 12

Students taking 6 to 9 semester hours
(graduate) ............................................... 322.00
plus $45.00 per semester hour for each hour over 9

The above costs include course, building, student union, registration, and student activity fees. Laboratory fees are charged for some courses and are added to the above costs.

Students taking fewer than 9 semester hours (undergraduate)
Registration fee, per term ................................ 5.00
Course fee for each semester hour,
to a maximum of $258, per term ......................... 30.00
Building fee, per semester hour, per term ............ 3.00
Union fee, per semester hour, per term plus $1.00 .. 1.00
Student activity fee, for students taking 8 semester hours,
per term .................................................. 19.00
for students taking less than 8 semester hours
per term ................................................... 9.00
Out-of-state fee - an additional fee equal to the total
of other fees, per term.

Students taking less than 6 semester hours (graduate)
Registration fee, per term ................................ 5.00
Course fee, for each semester hour to a maximum of
$258, per term ............................................ 45.00
Building fee, per semester hour, per term .......... 3.00
Student activity fee - per term ....................... 9.00
Union fee, per semester hour, per term, plus $1.00 .. 1.00
Out-of-state fee - an additional fee equal to total
of other fees, per term.
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 Cashier’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 Cashier’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 by 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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<td>Application (non-refundable)</td>
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<td>Change of schedule (non-refundable)</td>
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<tr>
<td>Drop/add/change to audit/reinstatement</td>
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<tr>
<td>Late registration (non-refundable)</td>
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<td>Examination (deferred or special)</td>
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<td>Credit by examination or validation, per semester hour</td>
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<td>Laboratory and studio instruction</td>
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<td>Level 1</td>
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<td>45.00</td>
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<tr>
<td>Level 7</td>
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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 met and if diploma has not 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 eighth 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

Dates of withdrawal from courses which are scheduled on other than a full-term basis will be prorated.

Refund checks will be issued as quickly as they can be processed.

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 Primary Medical Care

General fee (per term) .................................................. $ 800.00

Out-of-state residents (per term) .................................................. 3200.00

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 twelve 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.

Preschool Learning Center

<table>
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<tr>
<th>Attendance Plan</th>
<th>Monthly Fees</th>
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<tbody>
<tr>
<td>A. All day Full week @ $32. a week</td>
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<tr>
<td>B. All day MWF @ $8 a day</td>
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</tr>
<tr>
<td>C. All day TTh @ $8 a day</td>
<td>69.00</td>
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<tr>
<td>D. Half day Full week @ $16 a week</td>
<td>69.00</td>
</tr>
<tr>
<td>E. Half day MWF @ $4 a half day</td>
<td>52.00</td>
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<tr>
<td>F. Half day TTh @ $4 a half day</td>
<td>35.00</td>
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</table>
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, and auxiliary services.

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, awards, 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 1.0.

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 2.0 quality point average and not less than 2.5 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 1.0. 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 quality-point average, which must be 2.5 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 2.0 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 1.8 quality-point average on a 3.0 scale, 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 Departmental 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 quality-point average of 2.0, 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 2.0 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 Gorgas Scholarship-UUAH is a corporate institute for Gorgas Scholarship Award winners and offers a limited number of tuition scholarships to the ten finalists in the Gorgas Scholarship Foundation competition. These scholarships are renewable each year for four years if the student maintains a 2.0 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 2.0 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 participants in the Annual North Alabama Regional Science and Engineering Fair.

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 University Merit Scholarships—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 accumulative grade-point average at the end of the spring term.
The Huntsville Board of Realtors awards $1,200 annually to UAH students who have demonstrated scholastic achievement, but who must pursue their educational objectives on a part-time basis because of the financial necessity of working full-time.

The Economics Scholarship was established for a junior or senior student majoring in economics with a grade-point average of 2.0. The recipient will be selected jointly by the faculty of the Department of Business Administration and Economics and the Dean of the School of Humanities and Behavioral Sciences.

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 $5,000 over several years. Graduate or professional students may be eligible to borrow a maximum of $10,000, 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 $7,500 for undergraduate or vocational students. The aggregate maximum may be extended to $10,000 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.

A federal nursing scholarship grants up to $2,000 per year. This scholarship is available only to students of exceptional financial need who require assistance in order to pursue a course of study.

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 Basic Educational Opportunity 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 BEOG 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 BEOG application is submitted to a processing agency which calculates the student's eligibility index. The institution then uses this SEI 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
Federa1ly funded student financial aid (BEOG, 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.

Job Placement
In addition to helping students get financial aid, UAH provides the following job placement services to all students and alumni: (1) part-time employment opportunities in the community or within the university; (2) full-time placement opportunities for graduating seniors and for UAH alumni.

Contact is maintained with employers in education, industry, and government. The Office of Alumni Affairs and Job Placement arranges student-employer interviews on campus throughout the year. This office also maintains a career library of occupational information and company literature.

A complete and permanent personnel file, including a summary of college activities is established for each student who registers with this office. Information in this file is available to employers upon request.
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 in Morton Hall. 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 quality-point average (QPA) of at least 1.50 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 enrolled unconditionally as graduate students in science and engineering or administrative science.

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, Room 216, Morton Hall, telephone (205) 895-6741.

Law Enforcement Education Program

As authorized by the Omnibus Crime Control and Safe Streets Act of 1968 (PL 90-351), a Law Enforcement Student Grant and Loan Program has been established by the Law Enforcement Assistance Administration to encourage and to financially help persons pursuing or interested in pursuing law enforcement careers.

UAH participates in the Law Enforcement Student Grant Program which provides payments for tuition, not to exceed $250 a term. Those students awarded grants must agree to remain in the service of their employing agencies for two years following completion of any course of study funded by the grant.

The grant is restricted to in-service law enforcement officers of local, state, and federal units of government. Eligible students may enroll for part-time or full-time studies in any course acceptable toward satisfying the requirements for a bachelor's degree.

Applications are available in the Office of Financial Aids. These forms must be obtained, completed, and returned well in advance of the period of study for which they apply.
Vocational Rehabilitation

Students with 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 do not already have a physician may become patients of the UAH Ambulatory Care Center by phoning 536-5511 and completing the necessary forms. Emergency care is available for UAH students between 8 a.m. and 5 p.m. Monday through Friday at the Ambulatory Care Center. All medical services provided by the 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 Educa-
tional 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 all full-time students. Beginning in the fall of 1981, on-campus residence halls will be available for full-time single students, handicapped students, and married students without children. The off-campus townhouse apartments owned by the university will house full-time married students with children and are located within easy walking distance of the campus. The new on-campus residence halls will consist of one-bedroom efficiency apartments for married and handicapped students and three-bedroom suite apartments for six single students. Each of these units will be air-conditioned, carpeted, and equipped with an electric range, refrigerator, and window coverings. Furnished units (all three-bedroom suite apartments and some one-bedroom efficiency apartments) will have basic living room, dining area, and bedroom furniture. The three-bedroom suites will have a double bathroom facility. Several small Laundromat facilities will be provided for the on-campus housing area. The existing off-campus townhouse apartments are air-conditioned and carpeted with the furnished apartments having basic living room, dining area, and bedroom furniture.

Assignments are made on the basis of application date; alternative assignments and rental plans must be approved by the Director of Residential Life. Housing regulations and policies which are supplemental to this catalog are contained in the university housing brochure and in the rental agreement which residents sign. Students interested are responsible for obtaining this supplemental information and should apply at least one academic term before enrolling. Application forms and additional information may be obtained from: Housing Office, The University of Alabama in Huntsville, Huntsville, Alabama 35899, (205) 895-6108

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 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

Union facilities are open to the university community—students, faculty, and staff. Regular hours are Monday through Friday, 8:15 a.m. to 10:30 p.m.

The Union houses student lounges, meeting rooms, a game room, offices for Student Affairs, Student Government Association, Exponent, the bookstore (Book Nook), 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 on the second floor. A variety of video games, pinball, pool, backgammon, chess, and other table games provide entertainment for 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 from 7:30 a.m. to 5 p.m. 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 any time. Premium purchase rates are offered, however, at the end of each term.

Regular hours for the Book Nook are: Monday 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.

**UAH Supply Store**

Office supplies are available from the supply store in Morton Hall by a purchase requisition sent from a department, student club, or campus organization. The store’s hours of operation are 8:15 a.m. to 5:00 p.m. (closed during lunch). Deliveries of supplies are made every Friday. Hand-carried orders are filled while you wait. Supply-store catalogs are available on request.
Activities

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 “Hotline.” The number is 895-6666.

Student Organizations

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 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.

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 at UAH 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 UAH 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 UAH 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.

**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.

**University Christian Student Center**
The UCSC is an organization sponsored by the Churches of Christ in this area to provide the atmosphere of a “home away from home” for students who come from out of town to study. The three main areas of activity are spiritual, recreational and fellowship, and service projects.
Christian Students Organization
This organization was founded to promote spiritual growth and development among the college students of UAH.

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.

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.

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 Science and 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.

Forensics Team
The Forensics Team, occasionally called the Speech Club, competes yearly in several intercollegiate oratorical and debate tournaments as well as the National Annual Contest in Public Discussion. The team also sponsors on-campus current issue forums and public speaking contests. The team specializes in prepared argumentation events, impromptu speaking, and interpretive reading of prose, poetry, and drama.
Frisbee Club
The objectives of the Frisbee Club are to promote the sport of Frisbee on the UAH 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 UAH 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 UAH 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 UAH 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.

Indo-American Association
This organization provides opportunities for students interested in the culture of India to interact. Films of India are shown on a frequent basis. Membership is open to all students.

International Society for Hybrid Microelectronics (ISHM)
The university chapter of the International Society for Hybrid Microelectronics is open to all interested students and faculty. Activities promote an up-to-date engagement with the microelectronics industry. Guest speakers, field trips, and laboratory experience promote a continuing source of knowledge and interesting technology.

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. Students from Host-Hostesses 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 get in touch with the Vice-President for Student Affairs.

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 UAH 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.

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
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, and 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 2.5 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.

**Humanities and Behavioral Sciences Honorary**

The Humanities and Behavioral Sciences Honorary is for students majoring in one of the disciplines of the School of Humanities and Behavioral Sciences. Its purpose is to promote, encourage, and maintain academic excellence in the School of Humanities and Behavioral Sciences and to serve as a society in which those students who have demonstrated high academic achievement may organize and communicate with one another within the academic community. Standards for membership are completion of 64 semester hours (at least 32 at the university), a cumulative grade-point average of 2.5 or above and recommendation by a member of the humanities and behavioral sciences faculty.

**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.

**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 quality-point average of 2.5 and an overall average of 2.0 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 2.0 overall grade-point average and a 2.0 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 QPA of 1.75 and a QPA of 2.2 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 2.0 quality-point average.
Sigma Theta Tau
The purposes of this national honor society are to recognize superior achievement, recognize the development of leadership qualities, foster high professional standards, encourage creative work, and strengthen commitment to the ideal and purposes of the nursing profession. The Beta Phi chapter of Sigma Theta Tau was installed at the university in the spring of 1976.

Tau Beta Pi
Tau Beta Pi is the national engineering honor society founded to mark in a fitting manner those who have conferred honor on their Alma Mater by distinguished scholarship and exemplary character as students in engineering, or by their attainments as alumni in the field of engineering, and to foster a spirit of liberal culture in engineering colleges. To be eligible, a student must be in the upper eighth of the junior engineering class or the upper fifth of the senior engineering class as determined by work done at UAH.

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 university 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 at UAH 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 interna­
   tional 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 im­
   pressed 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.

Pep Band
   The Pep Band reflects the spirit and excitement of a growing university. This
   informal group plays at UAH home basketball games. No audition is
   necessary. Noncredit.

Intercollegiate Athletics
   UAH currently sponsors intercollegiate athletic programs in basketball, ten­
   nis, soccer, and rowing (crew). Membership is open to any qualified student.
   Intercollegiate teams are affiliated with the National Association of Inter­
   collegiate Athletics (NAIA), Association of Intercollegiate Athletics for
   Women (AIAW), Southern States Conference (SSC), Alabama Association of
   Intercollegiate Athletics for Women (AAIAW) and the Southern Inter­
   collegiate Rowing Association (SIRA).

Basketball (Men)
   In its short eight-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
   play a rugged non-conference schedule that includes such schools as Indiana
   State University, Western Kentucky, and Alabama State. The Chargers have
   won or shared the conference championship four times and have also won the
   conference tournament three times. Playing in what is recognized as one of the
   most powerful districts in the country, the Chargers have twice won the district
   championship, qualifying them for participation in the national tournament.
During the 1976 tournament, the team finished among the top eight teams and in 1977 finished among the top sixteen teams. In 1978, the Chargers were chosen to represent the United States in two international tournaments played in Brazil.

Basketball (Women)
UAH offered competitive intercollegiate basketball for women beginning with the 1977-78 season. The team is affiliated with the Alabama Association of Intercollegiate Athletics for Women (AAIAW), the Association of Intercollegiate Athletics for Women (AIAW), and the National Association of Intercollegiate Athletics (NAIA). During each of its first three seasons, the team qualified for state tournament play. The team plays a regional schedule.

Rowing
Rowing is the oldest sport at UAH. The rowing team is a member of the Southern Intercollegiate Rowing Association (SIRA), the National Women's Rowing Association (NWRA), and the National Association of Amateur Oarsmen (NAAO). The men's and women's crews compete against schools such as Michigan State University, Notre Dame University, University of Tennessee, University of Virginia, University of North Carolina, and Florida Institute of Technology. The crew participates in several major regattas each year during both fall and spring quarters. The 1972-73 lightweight four-oared crew won the Doc Bradley Trophy of the Dad Vail National Small College Championships. In the past four years the crew team placed in the top six of over twenty teams in the SIRA championship, winning the men's novice eight class in 1980. It also placed its four-oared men's crew fourth in the 1980 Dad Vail championships.

Soccer
In its eight years of NAIA competition, the UAH soccer team has gained the reputation as one of the strongest teams in the country, competing against soccer powers like Clemson, Quincy College, and Alabama A&M. UAH was the District 27 and Area 5 champions during the 1976 season, advanced to the NAIA National Championship Tournament at the Rose Bowl in Pasadena, California, and was ranked seventh in the nation. In 1977 the Chargers finished second in Area 5 and was the host team for the NAIA National Soccer Tournament, which was held at Charger Field in Huntsville. The 1978 Chargers were the Area 5 champion and advanced to the finals of the NAIA soccer championships, held in Huntsville again, before bowing to Quincy College in the championship game. The second place finish by the Chargers was the first time a southern team had advanced to the championship game. During the 1979 season the Chargers were again Area 5 champions and advanced to the NAIA championships finishing seventh. In 1980 the Chargers were very successful. A highlight of the 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.
Tennis (Women)
UAH initiated women’s intercollegiate tennis during the 1977-78 season. The team is affiliated with the AAIAW, AIAW, and NAIA. During the 1978 season, the team won the state championship and advanced to regional tournament play. In 1979, the Lady Chargers were runners-up in the state championships and again advanced to regional tournament play.

Club Sports
Hockey
The UAH Hockey Club was founded in the fall of 1979. In its inaugural season in the Southern Collegiate Hockey Association (SCHA), the Chargers compiled an outstanding 24-1 record enroute to winning the conference and conference tournament championships. Competing against teams such as Georgia Tech, Auburn, Tennessee, and Vanderbilt, the Chargers play all of their home matches in the beautiful 8,000-seat Von Braun Civic Center.

Rugby
The UAH Rugby Football Club was founded in the fall of 1974 and now competes in the sixteen-team Mid-South Rugby Union composed of schools such as Vanderbilt University, the University of Kentucky, and the University of Tennessee. In the past several seasons UAH has finished second and third in the conference tournament.

Track
A Track Club was established in the fall of 1977 to provide competitive running events open to all members of the university community. Noncompetitive activities related to the sport of running are also provided by this club.

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.

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 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 Organization

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 1.0 (C) quality-point average.

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 UAH 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 academic year and of the student’s academic program is commencement. Each year at the end of the spring term the university community conducts a special convocation of scholars, family, and friends to celebrate the completion of degree requirements by our graduates. This academic ceremony in full regalia also symbolizes the institution’s distinctive mission to engage in teaching, research, and public service.
Academic Information

Academic Advisement and Information Center

Located in Room 222 of Morton Hall, the Academic Advisement and Information Center is staffed by a team of experienced faculty members who are available to aid students in planning their academic programs. Students are welcome to use the services of the center when they wish to seek academic advice and information. Appointments may be made by calling 895-6290.

Freshmen (students who have completed fewer than 30 semester hours of course work) are given first priority in requesting services of advisers. They are also required to visit the center at least once a term to review their academic progress and plan their schedule of courses for the next term. All freshmen must have their schedules validated by an academic adviser at the center before their registration forms will be accepted by the Registrar's Office. All other undergraduates enrolled as special students must also have their schedules validated each term at the Academic Advisement and Information Center as long as they remain under this classification. Freshman nursing students receive advisement from faculty within the School of Nursing. Students enrolling for the first time or transferring into nursing are advised by the personnel in the School of Nursing advisement office. All other students, both lower division and upper division, must see their nursing adviser before each registration to have the registration card approved. Following advisement, the student is to have the schedule request card validated by the nursing advisement office before it will be accepted by the Registrar's Office.

Second priority is given to transfer students who wish to gain information concerning the general requirements of various undergraduate degree programs offered. These students are further referred to department chairmen who can aid them in planning programs in their major fields of interest.

All prospective students who wish to explore the academic programs available to them on this campus are welcome to make use of the services of the advisement team.

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.

The Campus General Information Center maintains a bulletin board of all university activities on and off campus to keep interested persons aware of cultural and other activities connected with the academic community. With
proper identification, students may obtain a limited number of free tickets to various cultural events on and off campus at this location. The center may be reached by calling 895-6295.

**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>Student 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>

**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

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)

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, regula-
tions, 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.

Confidentiality of Records

The Family Educational Rights and Privacy Act of 1974 is a federal law which protects the confidentiality of student education 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 per-
sons 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:

1. Director, Admissions and Records
2. Director, Academic Advisement and Information Center
3. Chairman, Nursing, Lower Division
4. Chairman, Nursing, Graduate Program
5. Director, Continuing Education
6. Vice-President, Student Affairs
7. Director, Medical Student Affairs
8. 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.

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 quarter, 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.

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.

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 $10. 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 biology, English, French, mathematics, and Spanish. Credit, if awarded, will be recorded without grades or quality points and will not, therefore, be included in calculation of the quality-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 (with essay)</td>
<td>53</td>
<td>HY 221,222</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>48</td>
<td>FH 101, 102, 201</td>
</tr>
<tr>
<td>College German, Levels I and II</td>
<td>36</td>
<td>GN 101</td>
</tr>
<tr>
<td>College German, Levels I and II</td>
<td>38</td>
<td>GN 101, 102</td>
</tr>
<tr>
<td>College German, Levels I and II</td>
<td>44</td>
<td>GN 101, 102, 201</td>
</tr>
</tbody>
</table>
*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**

Computer science ............................................ All courses
Mathematics ................................................. MA 104, 105, 119, 121, 143, 151, 153, 154, 233
Modern languages ........................................ Contact department chairman
Music .......................................................... MU 101, 102, 103, 110, 201, 202, 311, 312
Nursing ....................................................... Contact Nursing Advisement Office
Philosophy .................................................... PHL 102, 220
Sociology ..................................................... All courses except 100, 231, 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.
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 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.
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 Cashier'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.

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 scheduled meeting of the class.
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 may withdraw from one or more courses or from UAH by completing the request-for-withdrawal form secured from the Office of Admissions and Records. Regardless of a student's reason for withdrawal, he must carry out withdrawal procedures as follows:
1. A student must present a written request for withdrawal to the Office of Admissions and Records. A receipt for each such request will be issued. The
transaction will not be considered complete until the receipt is issued.

2. The official date of withdrawal is the date on which the written request is received and the receipt issued by the Office of Admissions and Records.

3. A student may withdraw from one or more courses during the first three weeks of the term with a grade of W.

4. After the first three weeks and through the eighth week of the term, a student may withdraw from one or more courses at his discretion. The grade of W or WF will be assigned by each instructor and grades assigned will be based on student performance to date of withdrawal.

5. After the beginning of the ninth week, a student may not withdraw from a course. If it becomes impossible for a student to attend after the beginning of the ninth week, the instructor may assign a final grade of A, B, C, D, or F (U or S in appropriate courses). The instructor may also assign an I, giving the student additional time to complete course requirements. Under extenuating circumstances, an instructor may appeal for exception on behalf of the student to the dean of the school in which the student is enrolled. A student may use the services of Academic Advisement and Information Center for interpretation of the appropriate procedures for his appeal. Such exception, if granted, would permit withdrawal under the provisions contained in paragraph 4 above.

Repeating a Course

The last grade received in a course taken more than once will be the official and only grade of the course for purpose of evaluation of quality points; but for the purpose of calculating quality-point average, a student is charged with hours attempted each time he registers for credit courses and receives a grade other than W or S.

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>........................................... 3</td>
</tr>
<tr>
<td>B-Above average</td>
<td>........................................ 2</td>
</tr>
<tr>
<td>C-Average</td>
<td>........................................... 1</td>
</tr>
<tr>
<td>D-Passing</td>
<td>........................................... 0</td>
</tr>
<tr>
<td>F-Failure</td>
<td>........................................... 0</td>
</tr>
</tbody>
</table>

I-Incomplete.
Assigned by the instructor when a student 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 corrected grade sheet containing a written explanation of the error. The corrected grade sheet 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.

Quality-Point Average

The quality-point average (QPA) 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 QPA of 2.50-3.00 is distinguished by being identified as an honor scholar.

A student who takes less than 8 semester hours a term and establishes a QPA of 2.50-3.00 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 QPA of 2.00-2.49 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 QPA of 2.00-2.49 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 QPA of 2.20 up to 2.50 will be graduated with honor; a student with a QPA of 2.50 up to 2.80 will be graduated with high honor; a student with a QPA of 2.80-3.00 will be graduated with highest honor.

In determining eligibility for honors, a student’s overall QPA as well as his QPA 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

A beginning student is subject to scholastic review at the end of the term in which he has attempted a total of at least 8 semester hours of work. At the time of review, if he has not passed one-half of work attempted or attained a QPA of 0.5, he is placed on scholastic probation.

A transfer student is subject to scholastic review at the end of the term in which he has attempted at least 8 semester hours of work. At the time of review, if his QPA is less than 1.0 at UAH, he is placed on scholastic probation.
After the first evaluation, a full-time student's record is examined at the end of each term. The record of a part-time student is reviewed at the end of the term in which a total of at least 8 semester hours has been attempted.

At the time of review, a student will be placed on scholastic probation if his overall QPA for work attempted at all institutions is less than 1.0 (C). He also will be placed on probation if his average for work attempted at UAH is only less than 1.0 (C).

For a student on scholastic probation, the following chart outlines subsequent actions:

<table>
<thead>
<tr>
<th>Overall* QPA</th>
<th>Quality Point Deficiency**</th>
<th>Action Indicated</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 or higher</td>
<td>7 or less</td>
<td>Probation removed</td>
</tr>
<tr>
<td>Less than 1.0 and</td>
<td>1.0 or higher or</td>
<td>Probation continued</td>
</tr>
<tr>
<td>Less than 1.0 and</td>
<td>Less than 1.0 and</td>
<td>Suspension</td>
</tr>
</tbody>
</table>

*For a transfer student admitted with less than a 1.0 average, overall QPA includes all work from all institutions. For a transfer student admitted with 1.0 average or higher, overall QPA in this instance covers all work attempted at UAH.

**Including transferred deficiencies.

A student suspended for scholastic reasons is eligible to return on scholastic probation at the beginning of the second term following suspension. A special nondegree student suspended for scholastic reasons must petition the Admissions Committee for permission to re-enroll.

A student suspended the second time for scholastic reasons within the University of Alabama System is disqualified for readmission. After a period of one year the 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.

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

At the end of the sophomore year, all students pursuing a B.A., B.S., or B.S.B.A. degree should file a request to declare a major at the Office of Admissions and Records. If a student subsequently decides to change to a dif-
different major within the same school, he should file such request with the Office of Admissions and Records. (See Change of School.)

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. 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 QPA; a grade of F will be counted in a student’s QPA.

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. Even though a student chooses to take elective courses on the P-F basis, instructor’s grade sheets will reflect the actual grade and the student may be informed of the regular grade upon request.

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 in identifying requirements remaining to be completed.

Students completing degree requirements in any term other than spring term 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 School, 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 four schools with the following approved major programs:

School of Humanities and Behavioral Sciences
Areas of study in which majors are currently offered are the following:

Art
Criminal justice
Education
English
French
German
History

Music
Music education
Political science
Psychology
Slavic studies
Sociology

Other areas with course offerings are American studies, communications, linguistics, philosophy, Russian, Spanish, physical education, and leisure studies.
School of Science and Engineering
Areas of study in which majors are currently offered are:

- Biology
- Chemistry
- Chemical engineering
- Civil engineering
- Electrical engineering
- Industrial and systems engineering
- Mathematics
- Mathematics education
- Mechanical engineering
- Physics
- Courses are also offered in computer sciences, environmental sciences, 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.

School of Administrative Science
Areas of study in which majors are currently offered are:

- Business (options in Accounting, Finance, Management, Marketing)
- Economics

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, biology, criminal justice, economics, education, English, French, German, history, mathematics, mathematics education, music, music education, political science, psychology, Slavic studies, sociology
- Bachelor of Science—Biology, chemistry, education, mathematics, mathematics education, physics
- Bachelor of Science in Business Administration—Accounting, finance, management, marketing
- 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.

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 Behavioral Sciences**

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Semester Hours</th>
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</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>6</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 (one discipline)</td>
<td>6</td>
</tr>
<tr>
<td>[If major is psychology, the social sciences requirement should be taken in one of the other disciplines.]</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Foreign language</th>
<th>6-12</th>
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<tbody>
<tr>
<td>(See section entitled Modern Foreign Languages.)</td>
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</tbody>
</table>

**Science-Mathematics**

(Laboratory sciences consist of courses in biology, chemistry, environmental sciences, 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 Behavioral Sciences

<table>
<thead>
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</tr>
<tr>
<td>Foreign language (See section entitled Modern Foreign Languages.)</td>
<td>6-12</td>
</tr>
</tbody>
</table>

### Science-Mathematics

Two sciences selected from biology, 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. 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, 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:

1. Biology ....................................................... 8
2. Inorganic chemistry (including qualitative analysis) .............................. 8
3. Organic chemistry ..................................................................... 8
4. Quantitative analysis .................................................................. 4
5. Physics (including laboratory) ......................................................... 8
6. College algebra and trigonometry ..................................................... 6
7. 30 semester hours for 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
8. The completion of a minimum of 90 semester hours of collegiate work.

Students should elect courses in mathematics through calculus and should not elect biology courses that constitute a part of the dental school curriculum.
Students interested in preprofessional health programs (predentistry, premedicine, preoptometry, preveterinarian medicine) are encouraged to contact the preprofessional adviser by calling the Office of the Dean, School of Science and Engineering.

Medical Technology
A bachelor's degree program with emphasis in premedical technology is available through the Biology 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 or Secondary Professional Teaching Certificate in any of the approved major areas of concentration, a Class B Elementary-Secondary Professional Certificate in Art, and a Class A Special Education Professional Certificate with an endorsement in learning disabilities. 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 (see also p. 283). 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.
The School of Administrative Science is a professional school dedicated to the education of students who will enter business, industry, and government at all levels of responsibility. Its graduate and undergraduate programs are committed to a standard of excellence in encouraging students to reach their full potential on professional as well as individual levels. A basic premise of the school's mission is that the increasing influence and importance of complex organizations requires the development of competent and creative managers who understand the role of complex systems now and in the future. To prepare students for the challenges of the future, the school provides a solid background in academic disciplines that relate to the needs of business, industry, and government. Those needs are met within the school through undergraduate courses in accounting, business, economics, finance, management, and marketing and in graduate study in administrative science. Study in these areas along with the behavioral sciences, humanities, and mathematics allows students to discern the diverse aspects of management problems ranging from the human element to technical data.

Undergraduate Degrees and Study

Within the School of Administrative Science a student may earn a Bachelor of Science in Business Administration or a Bachelor of Arts in Economics. The Bachelor of Science in Business Administration offers options in accounting, finance, management, and marketing. Each student must declare an area of concentration (AOC) no later than the close of the sophomore year.

Graduate Degree and Study

The School of Administrative Science offers a Master of Administrative Science, which is a professional degree in management and administration. Requirements for degrees and course descriptions are listed in the following sections.

Although no specific undergraduate social science prerequisites are required for admission to the program, students who wish to take certain options must meet the prerequisites in those courses. The program is professional in character. Although no thesis is required, the student must show investigative and analytical abilities in one or more of the courses.
Graduate Program in Administrative Science

Associate Professor Olsen, Adjunct Associate Professor Davis, Assistant Professor Rees

The purpose of the graduate program in administrative science is to develop administrators who have an understanding of organizational theory and the techniques for management and organizational problem-solving. A premise of the program is that many of the concepts and principles of management are fully applicable to both public and private sectors. The program prepares the student in general administration and management as well as in a specialized option. Its interdisciplinary character gives students an understanding of the operations of various complex organizations as well as the relationship of academic disciplines to the study of management. The majority of students are actively involved in administrative and managerial positions while pursuing a Master of Administrative Science. This opportunity for interaction among students working in complex organizations reinforces the application of academic study. This emphasis allows them to relate theoretical concepts of organizational thought to the challenges facing present-day managers and administrators.

Requirements for Admission

In addition to the requirements of the School of Graduate Studies, admission to the Graduate Program in Administrative Science is based on previous academic performance, results of the Graduate Management Admissions Test (GMAT) and previous or current administrative work experience. All students seeking admission must satisfactorily complete GMAT. Requirements for unconditional admission to the program are a minimum score of 450 on the GMAT and a minimum overall grade-point average of 2.0 (3.0 point scale) or a grade-point average of 2.15 for the last 60 hours of upper division or graduate work.

A student not meeting the above criteria may be admitted on a probationary basis at the discretion of the program director, the Dean of the School of Administrative Science, and the Dean of Graduate Studies.

Students admitted on a probationary basis must maintain a B average for the first 12 hours of academic work.

Degree Requirements

In addition to degree requirements established by the School of Graduate Studies, all students must complete the core curriculum (21 semester hours), a minimum of 15 hours in an option, and a comprehensive examination administered by a committee of graduate faculty members.

Core Curriculum

The core curriculum is designed to provide the student with a firm foundation in organizational theory, relevant theories of motivation and leadership, an understanding of internal and external factors affecting organizations, exposure to organizational problem-solving, and an introduction to quantitative research and decision-making techniques. It is strongly recommended that AS 621 be taken before the remainder of the core curriculum. The core curriculum consists of AS 621, AS 622, AS 623, AS 624, AS 626, AS 627, AS 634.
Administrative Science Options
Each student in the Administrative Science Program must complete a minimum of 15 hours in electives. 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 director of the program. Additional information concerning the options offered outside the Graduate Program in Administrative Science may be obtained from the respective heads of the departments. Course descriptions for option courses are listed in the respective departmental sections of the catalog.

Administrative Science Option (course descriptions follow)
Required: AS 629 and AS 630
Electives: AS 625, AS 631, AS 632, AS 633, AS 650, PY 502
Electives may also be chosen from 500-level courses in the Department of Business Administration and Economics.

Project Management Option
Required: AS 629 or AS 630
Electives: AS 640, AS 641, AS 642, AS 643

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

Public Administration Option
Required: PA 512 and PA 515
Electives: PA 510, PA 560, PA 568, PSC/PA 500

Economics Option
Required: EC 510 (or departmental waiver), EC 600 and EC 610
Electives: EC 546, EC 564, EC 585, EC 620, EC 630, EC 640

Computer Science Option
Required: CS 511
Electives: Students taking this option should consult the department chairman before selecting electives.

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 AS 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.
Administrative Science (AS)

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.

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.

624 Organizational Problems 3 hrs.
Organizational and group interface problems and processes and principles bearing on their solutions by simulations, case analyses, and structured interactions. Prerequisite: AS 621 or AS 622.

626 Applied Managerial Decision Economics 3 hrs.
Economic and financial problems of organizations and decision-making techniques for solving these problems. The time-value of money, equivalence comparison methods, cost of capital, depreciation and cash flow; capital budgeting, breakeven, and replacement analysis. Linear programming, transportation models, and inventory control.

627 Research and Quantitative Methods in Administrative Science 3 hrs.
Basic methods of investigating and solving administrative problems involving uncertainty. Descriptive statistics, elementary probability concepts, discrete and continuous probability distributions, elementary sampling, statistical inference, linear regression, and time series.

634 Seminar in Administrative Science 3 hrs.
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.

Administrative Science Option Electives

625 Labor Relations and the External Environment 3 hrs.
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 on labor relations and on the organization’s relations with the external environment. The public and news-media impact upon management actions.

629 Leadership and Motivation 3 hrs.
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.

630 Industrial Sociology 3 hrs.
Development of modern work relations in an historical and dialectical framework. These relations as the outcome of use of physical and social technologies by managers
and workers to advance their respective interests. Consequences of modern work relations in cultural values such as democracy and individuality. Alternative work relations with attention to industrial democracy.

631 Personnel Administration in Organizations 3 hrs
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.

632 Civil Systems Planning 3 hrs.
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.

633 Socio-Economic Consequences of Government Procurement 3 hrs.
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.

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 24 hours of a student's curriculum and approval of the Director of the Administrative Science Program.

Business Administration and Economics Department

University Professor Graves; Professors: Bond, Bucher; Associate Professors: Bryson, Wu; Assistant Professors: Griffin, Scriven, Sherman, Spence; Adjunct Assistant Professors: Billions, Graves, McCoy, Petty; Instructors: Comstock, Lester, Ostermann.
Business Administration Programs
The Business Administration and Economics Department offers a Bachelor of Science in Business Administration and a Bachelor of Arts in Economics.

Requirements for the B.S.B.A. Degree
The B.S.B.A. degree requirements can be satisfied with a major in accounting, finance, management, or marketing.

Minimum requirements for the Bachelor of Science in Business Administration degree are 128 semester hours. To meet the requirements for a B.S.B.A. degree, the student must satisfy 45 to 47 semester hours of General Education Requirements, complete an approved Area of Concentration (AOC) and take a minimum of 12 hours of electives chosen from disciplines not in the AOC. Courses that are included both in GER and also the AOC are omitted in calculating hours in AOC.

Students transferring from other institutions must take a minimum of 12 semester hours in the major option at UAH and 12 semester hours of course work offered by the Business Department in the core requirements.

The following sequences were developed in cooperation with the Mathematics and Computer Science Departments to enhance the educational program of business students. Business students planning to take mathematics or computer science courses beyond the minimum requirements follow the sequences outlined below:

Mathematics
- MA 105 College Algebra
- MA 143 Finite Mathematics
- MA 151 Introduction to Calculus

Computer Science
- CS 100 Basic Computers and Computing
- CS 211 Introduction to Computers in Business
- CS 310 Introduction to Business Data Processing
- CS 411 Computer Applications in Economics and Business II

Course descriptions are found under the respective departments.

General Education Requirements

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Semester hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Composition EH 101, 102, or EH 103, 104</td>
<td>6</td>
</tr>
<tr>
<td>Basic Speech Communication CM 113</td>
<td>3</td>
</tr>
<tr>
<td>College Algebra MA 105 or Level II placement</td>
<td>3</td>
</tr>
<tr>
<td>Library Research BIB 100</td>
<td>1</td>
</tr>
</tbody>
</table>

| Humanities                                                                     | 15             |
| Maximum of 6 hours in one discipline:                                          |                |
| Art, communications other than CM 113, foreign language, American studies,    |                |
| literature, music, philosophy, or history                                       | 9              |
| Either history or literature                                                   | 6              |

| Social Sciences                                                                | 12             |
| Maximum of 6 hours in one of the following disciplines                         |                |
| Political science, psychology, or sociology                                   |                |
Science and Quantitative Studies

Computer science (above CS 113), EC 310, BUS 325, mathematics 
(above MA 105), science (biology, chemistry, environmental science, 
natural science, or physics), or statistics above BUS 231

Total 46-48

Electives

Total 20-28

Area of Concentration—Major Options

The following courses are required:

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 100 or CS 113 Introduction to Computing</td>
<td>3</td>
</tr>
<tr>
<td>EC 142 Principles of Economics I</td>
<td>3</td>
</tr>
<tr>
<td>EC 143 Principles of Economics II</td>
<td>3</td>
</tr>
<tr>
<td>AC 211 Principles of Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>AC 212 Principles of Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>FIN 301 Principles of Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGT 385 Operations Management</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>BUS 231 Statistical Analysis</td>
<td>3</td>
</tr>
<tr>
<td>BUS 321 Business Law</td>
<td>3</td>
</tr>
<tr>
<td>BUS 420 Business Policy</td>
<td>3</td>
</tr>
</tbody>
</table>

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Additional requirements for each major option:

Accounting (AC)

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC 313 Income Tax I</td>
<td>3</td>
</tr>
<tr>
<td>AC 314 Cost Accounting</td>
<td>3</td>
</tr>
<tr>
<td>AC 310 Intermediate Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>AC 311 Intermediate Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>AC 312 Intermediate Accounting III</td>
<td>3</td>
</tr>
<tr>
<td>AC 415 Advanced Accounting</td>
<td>3</td>
</tr>
<tr>
<td>AC 431 Auditing I</td>
<td>3</td>
</tr>
<tr>
<td>AC 432 Auditing II</td>
<td>3</td>
</tr>
</tbody>
</table>

24

Finance (FIN)

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN 352 Money and Banking</td>
<td>3</td>
</tr>
<tr>
<td>FIN 375 Financial Institutions</td>
<td>3</td>
</tr>
<tr>
<td>FIN 362 Security Analysis and Portfolio Management</td>
<td>3</td>
</tr>
<tr>
<td>FIN 431 Managerial Finance and Policy Determination</td>
<td>3</td>
</tr>
<tr>
<td>FIN 550 Seminar in Finance</td>
<td>3</td>
</tr>
<tr>
<td>FIN 554 International Finance</td>
<td>3</td>
</tr>
</tbody>
</table>

81
Management (MGT)
MGT 361 Organizational Behavior ........................................... 3
MGT 363 Personnel: Human Resource Management ........................... 3
MGT 430 Business and Society ................................................. 3
MGT 362 Management and Labor Relations ................................... 3

Six hours from the following:
MGT 520 International Management
MGT 570 Seminar in Management
MGT 405 Small Business Management ....................................... 3

18

Marketing (MKT)
MKT 332 Consumer Behavior .................................................... 3
MKT 342 Promotional Strategy ................................................. 3
MKT 343 Market Research ....................................................... 3
MKT 345 Market Channel Structure and Strategy ........................... 3

Six hours from the following:
MKT 410 Marketing Management
MKT 430 Business and Society
MKT 560 Seminar in Marketing ................................................. 3

18

Business Administration Minor
A student who is majoring in another discipline and is interested in a
business administration minor may choose a minimum of 21 semester hours.
The following courses should be included in the 21 hour minor: AC 211, AC
212, FIN 301, MGT 301, MKT 301. The student may choose 6 additional
hours from other business offerings. Other minors can be arranged in con­
sultation with and approval of the department.

Certificate in Accounting
Many individuals have expressed a desire to change career goals after receiv­
ing 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 had majored in accounting. To meet students’
changing career objectives and to meet minimum requirements so that students
may take the CPA exam 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 usual­
ly takes approximately two years to complete this program, because of the se­
quence of courses and prerequisites.
CS 100
or
CS 113 Introduction to Computing .............................................. 3
BUS 321 Business Law .......................................................... 3
AC 211 Principles of Accounting I ......................................... 3
AC 212 Principles of Accounting II ......................................... 3
AC 310 Intermediate Accounting I ......................................... 3
AC 311 Intermediate Accounting II ......................................... 3
AC 312 Intermediate Accounting III ........................................ 3
AC 313 Income Tax I ......................................................... 3
AC 314 Cost Accounting ..................................................... 3
AC 415 Advanced Accounting ................................................ 3
AC 431 Auditing I .............................................................. 3

One of the following:
AC 432 Auditing II
AC 417 Government Accounting
AC 323 Income Tax II ......................................................... 3

---

The student must counsel with the Department of Business Administration and Economics, have the approval of the department chairman before enrolling in the program, and have been admitted to UAH as a regular student. A maximum of 9 hours will be accepted by transfer credit to apply to the Certificate in Accounting program.

**Business (BUS)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>231</td>
<td>Statistical Analysis</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>311</td>
<td>Computer Application in Economics and Business I</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>321</td>
<td>Business Law I</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>322</td>
<td>Public Policy Toward Business</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>325</td>
<td>Intermediate Economic and Business Statistics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>331</td>
<td>Business Law II</td>
<td>3 hrs.</td>
</tr>
</tbody>
</table>

*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-square and “t” distribution. Prerequisite: MA 105 or its equivalent or the approval of the instructor. (Same as HBS 231).*

*Prerequisite: junior standing and have been admitted to UAH as a regular student. (Same as CS 311).*

*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. Prerequisite: junior standing and have been admitted to UAH as a regular student.*

*Prerequisite: junior standing and have been admitted to UAH as a regular student. (Same as EC 322).*

*Prerequisite: junior standing and have been admitted to UAH as a regular student. (Same as EC 325).*

*Partnerships, corporations, legal problems of business organization, insurance, security devices, personal property, real property, leases, trusts and estate administration.*
Business organization and various problems affecting the enterprise. Recommended for accounting majors. Prerequisites: junior standing and have been admitted to UAH as a regular student.

411 Computer Applications in Economics and Business II 3 hrs.
Prerequisite: senior standing and have been admitted to UAH as a regular student.
(Same as CS 411).

420 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 and completion of all core courses.

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 business problems. Prerequisites: senior standing and approval of the department chairman.

Accounting (AC)
All accounting requirements for the Bachelor of Science in Business Administration 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.

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.

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. Prerequisite: AC 211.

310 Intermediate Accounting I 3 hrs.

311 Intermediate Accounting II 3 hrs.
Continued in-depth theoretical and practical treatment of selected accounting topics covering balance-sheet classifications of assets and liabilities. Current assets, investments, property, plant, and equipment. Intangible and other assets. Current and contingent liabilities, and interperiod tax allocation. Prerequisite: AC 310, junior standing.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>312</td>
<td>Intermediate Accounting III</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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, junior standing.</td>
<td></td>
</tr>
<tr>
<td>313</td>
<td>Income Tax I</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Determination of taxable income, business and nonbusiness deductions, and selected aspects of tax accounting for individuals and sole proprietorships. Prerequisites: AC 311, junior standing, and have been admitted to UAH as a regular student.</td>
<td></td>
</tr>
<tr>
<td>314</td>
<td>Cost Accounting</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Role and importance of cost and revenue data. Various cost systems applicable to the process of management decision-making. Prerequisite: AC 212, junior standing, and have been admitted to UAH as a regular student.</td>
<td></td>
</tr>
<tr>
<td>323</td>
<td>Income Tax II</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Tax accounting for partnerships, corporations, Sub, S corporations, estates, and trusts, social security taxes, tax audits, and tax research. Prerequisites: AC 313, junior standing, and have been admitted to UAH as a regular student.</td>
<td></td>
</tr>
<tr>
<td>415</td>
<td>Advanced Accounting</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Specialized accounting including partnerships, business combinations, international operations, corporate liquidations and reorganization, estates and trusts, and governmental accounting. Prerequisite: AC 312, senior standing, and have been admitted to UAH as a regular student.</td>
<td></td>
</tr>
<tr>
<td>417</td>
<td>Governmental (Fund) Accounting</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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 310 and senior standing.</td>
<td></td>
</tr>
<tr>
<td>420</td>
<td>Internship in Accounting</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>431</td>
<td>Auditing I</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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 311, HBS 231, senior standing and have been admitted to UAH as a regular student.</td>
<td></td>
</tr>
<tr>
<td>432</td>
<td>Auditing II</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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, senior standing, and have been admitted to UAH as a regular student.</td>
<td></td>
</tr>
<tr>
<td>450</td>
<td>Studies in International Accounting</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Differences in principles of accounting and auditing standards, and auditing procedures in selected countries of the world. Prerequisite: AC 312 and senior standing.</td>
<td></td>
</tr>
<tr>
<td>Course</td>
<td>Title</td>
<td>Credits</td>
</tr>
<tr>
<td>--------</td>
<td>-------</td>
<td>---------</td>
</tr>
<tr>
<td>460</td>
<td>Controllership</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>540</td>
<td>Managerial and Financial Accounting</td>
<td>3 hrs.</td>
</tr>
</tbody>
</table>

**Finance (FIN)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>260</td>
<td>Personal Finance</td>
<td>3 hrs.</td>
<td>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.</td>
</tr>
<tr>
<td>301</td>
<td>Principles of Finance</td>
<td>3 hrs.</td>
<td>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 211, EC 143, and junior standing.</td>
</tr>
<tr>
<td>352</td>
<td>Money and Banking</td>
<td>3 hrs.</td>
<td>Organization, operation, and economic significance of monetary and banking systems. Prerequisite: EC 143, and junior standing. (Same as EC 352).</td>
</tr>
<tr>
<td>353</td>
<td>Public Finance</td>
<td>3 hrs.</td>
<td>Principles of federal government taxation and expenditures, borrowing, and fiscal administration. Prerequisite: EC 143 and junior standing. (Same as EC 353 and PSC 353).</td>
</tr>
<tr>
<td>362</td>
<td>Security Analysis and Portfolio Management</td>
<td>3 hrs.</td>
<td>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 and junior standing.</td>
</tr>
<tr>
<td>375</td>
<td>Financial Institutions</td>
<td>3 hrs.</td>
<td>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 and junior standing.</td>
</tr>
<tr>
<td>431</td>
<td>Managerial Finance and Policy Determination</td>
<td>3 hrs.</td>
<td>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.</td>
</tr>
<tr>
<td>452</td>
<td>State and Local Finance</td>
<td>3 hrs.</td>
<td>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).</td>
</tr>
</tbody>
</table>
Graduate and Undergraduate Credit

550 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: senior or graduate standing, FIN 431 or permission of instructor.

554 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 or graduate standing or approval of department.

590 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.

Management (MGT)

301 Principles of Management 3 hrs.
Elements of the managerial process fundamental to successful operation of various types of enterprises. Prerequisite: junior standing or approval of department.

361 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, junior standing and have been admitted to UAH as a regular student.

362 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, junior standing and have been admitted to UAH as a regular student.

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, junior standing and have been admitted to UAH as a regular student.

385 Operations Management 3 hrs.
Management of production operations function in business organizations. Production systems design considerations, production planning, production control, inventory control, quality control, and maintenance. Applicable quantitative methods. Prerequisite: MGT 301, HBS 231, junior standing, and have been admitted to UAH as a regular student.

405 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, senior standing and have been admitted to UAH as a regular student.
430 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, senior standing, and have been ad-
mitted to UAH as a regular student. (Same as MKT 430).

440 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 abil-
ity to understand and apply knowledge from several disciplines to day-to-day opera-
tions of business enterprise. Prerequisite: approval of SBI director.

Graduate and Undergraduate Credit

520 International Management 3 hrs.
Management of the multinational business enterprise in interaction with its political,
economic, social, cultural, and legal environments.

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

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 ap-
proval 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, junior standing, and have been admitted to
UAH as a regular student.

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, junior standing, and have been ad-
mitted to UAH as a regular student.

343 Market 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, HBS 231,
junior standing, and have been admitted to UAH as a regular student.

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 struc-
tures and dynamic interrelationships in distribution logistics. Prerequisite: MKT 301,
junior standing, and have been admitted to UAH as a regular student.

410 Marketing Management 3 hrs.
Management of marketing function of the firm: determination of objectives, organiza-
tion 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, senior standing, and have been admitted to UAH as a regular student.

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, senior standing, and have been admitted to UAH as a regular student.

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, senior standing, and have been admitted to UAH as a regular student.

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, senior standing, and have been admitted to UAH as a regular student. (Same as MGT 430).

Graduate and Undergraduate Credit

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: 15 hours in marketing.

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 instructor.

Requirements for B.A. Degree in Economics

The Department of Business Administration and Economics requires that the student desiring an Area of Concentration (AOC) in economics must include in his program 21 semester hours of core courses in addition to EC 142-143 that include the following: EC 310, 340, 341, 345, 352, 448. In addition to these courses, the student can take an additional 15 hours of other courses offered in the department in his area of interest.

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>HBS 231</td>
<td>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>
</tbody>
</table>
An example of an AOC for a degree in economics for students interested in entering the labor force:

AC 211  Principles of Accounting ........................................ 3
MGT 301  Essentials of Management ........................................ 3
HBS 231  Statistical Analysis ............................................. 3
EC 310  Introduction to the Use of Mathematics in Economics ........... 3
EC 321  Engineering Economy ............................................ 3
EC 322  Public Policy Toward Business ..................................... 3
EC 325  Intermediate Statistics ........................................... 3
EC 340  Macro Economic Analysis .......................................... 3
EC 341  History of American Economic Growth ............................ 3
EC 345  Micro Economic Analysis .......................................... 3
EC 352  Money and Banking ................................................ 3
EC 430  Advanced Economic and Business Statistics ....................... 3
EC 448  Development of Economic Theory ................................... 3

An example of a supportive mathematics minor for an AOC with a major in economics:

MA 153  Calculus and Analytic Geometry ................................ 3
MA 154  Calculus and Analytic Geometry ................................ 3
MA 233  Calculus and Analytic Geometry ................................ 3
MA 244  Introduction to Linear Algebra .................................. 3
MA 251  Calculus and Analytic Geometry ................................ 3
MA 352  Introduction to Differential Equations ........................ 3
MA 385  Introduction to Probability Theory .............................. 3

Economics Minor
A student having an area of interest in a discipline other than that of 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 possible minors with a major in various other disciplines:

**Mathematics**

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<th>Semester Hours</th>
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<tbody>
<tr>
<td>EC 142 Principles of Economics ................................... 3</td>
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<td>EC 143 Principles of Economics ................................... 3</td>
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<tr>
<td>HBS 231 Statistical Analysis ........................................ 3</td>
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<td>EC 352 Money and Banking ........................................... 3</td>
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Any three of the following five courses

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<th>Semester Hours</th>
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<tr>
<td>EC 340 Macro Economics Analysis ..................................... 3</td>
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<td>EC 341 History of American Economic Growth .............................. 3</td>
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<td>EC 345 Micro Economic Analysis ...................................... 3</td>
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<tr>
<td>EC 430 Advanced Economic and Business Statistics ................... 3</td>
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<td>EC 448 Development of Economic Theory .................................. 3</td>
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**History or Political Science**

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<td>EC 142 Principles of Economics ................................... 3</td>
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<td>EC 143 Principles of Economics ................................... 3</td>
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<tr>
<td>EC 322 Public Policy Toward Business .............................. 3</td>
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<td>EC 341 History of American Economic Growth ...................... 3</td>
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<td>EC 344 European Economic History ................................ 3</td>
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<td>EC 353 Public Finance ............................................... 3</td>
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<td>EC 585 Comparative Economic Systems .................................. 3</td>
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**Psychology or Sociology**

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<td>EC 341 History of American Economic Growth ...................... 3</td>
</tr>
<tr>
<td>EC 585 Comparative Economic Systems .................................. 3</td>
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**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, is to be selected from courses listed below with the help of the economics education faculty adviser and approved by the chairman of the Department of Business Administration and Economics. This curriculum may require more than the minimum total of 128 hours for the degree.

**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. 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. 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, Engels, 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. Prerequisite: CS 308. Same as BUS 311 and CS 311.

315 **Urban Economics** 3 hrs.
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.

321 **Engineering Economy** 3 hrs.
Economic evaluation of engineering alternatives. Interest, depreciation, time-value of investments, learning curves, and replacement analysis. (Same as EG 321).
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
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| 322         | Public Policy Toward Business                    | 3 hrs.
|             | 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. |
| 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: HBS 231 or its equivalent. (Same as BUS 325). |
| 340         | Macro Economic Analysis                          | 3 hrs.
|             | 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. |
| 341         | History of American Economic Growth             | 3 hrs.
|             | Origins of basic economic institutions in Europe; detailed historical development of these institutions in the United States. Prerequisite: EC 143 or permission of instructor. |
| 344         | European Economic History                        | 3 hrs.
|             | Industrial Revolution to current developments covering institutions, activities, economic systems, and policies. Prerequisite: EC 143 or permission of instructor. |
| 345         | Micro Economic Analysis                          | 3 hrs.
|             | 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. |
| 352         | Money and Banking                                | 3 hrs.
|             | Organization, operation, and economic significance of monetary and banking systems. Prerequisite: EC 143. (Same as FIN 352). |
| 353         | Public Finance                                   | 3 hrs.
|             | Principles of taxation, government expenditures, borrowing, and fiscal administration. Prerequisite: EC 143. (Same as FIN 353). |
| 400         | The Soviet Economy                               | 3 hrs.
|             | Soviet economic theory and strategy for economic growth; practice of economic planning, resource development and utilization, interpretation of economic performance, and comparison with China. |
| 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. Prerequisite: EC 311. (Same as BUS 411 and CS 411). |
| 430         | Advanced Economic and Business Statistics        | 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. Prerequisite: EC 310, 325, or approval of instructor. |
| 448         | 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, 340. |
| 452         | State and Local Finance                          | 3 hrs.
|             | Administration, fiscal importance, and economic effects of state and local finances. Re- |
cent trends in state and local revenue and expenditure and their significance. Prerequisite: EC 142. (Same as FIN 452).

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

Graduate and Undergraduate Credit

510 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. Prerequisite: approval of instructor.

546 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. EC 510 and approval of instructor for noneconomic majors.

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

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

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.

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 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). Prerequisite: EC 430, EC 510, and approval of the instructor for noneconomic majors.

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. Prerequisite: 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.
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 Biology, 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 Engineering and Physics
- Doctor of Philosophy (Ph.D.) in Computer Science, Engineering and Physics, 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.

Members of the faculty with rank above that of instructor may not pursue work toward an advanced degree at UAH.

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 school concerned).

Unconditional Admission

An applicant must have an overall quality-point average of at least 2.0 (A = 3.0) or at least 2.0 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, see Administrative Science section. 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.

Students may be admitted on a probationary basis based on a minimum score of 50 on the Miller Analogies Test (MAT), which is administered and graded locally.

Probationary 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 probationary basis if the applicant has taken the GRE or the MAT. The applicant must meet one of the following requirements: (1) a quality-point average of at least 1.5 (A = 3.0) or (2) a score on the aptitude portion of the GRE of at least 1,000 or (3) a quality-point average on the last 60 hours of at least 2.0 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 QPA grade requirements expected of the probationally 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 QPA or QPA for the last 40 hours of at least 2.5
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 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 he meets the qualifications for probationary admission.

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 he meets admission criteria of the latter department.

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 his
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.

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.

Probationary Status
1. A student admitted on probation 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 ad­
mitted student. Any time his overall grade average drops below a B average, he
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.

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.

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, the dean of the major school, 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 Admissions and Records.

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 graduate courses that have been completed more than six years must be revalidated. The departmental faculty determines the
method of revalidation subject to the approval of the graduate dean. Such an examination will be equivalent to a final examination in the course. A student may take such an examination to validate a particular course only once.

Credit for courses transferred from other institutions cannot be validated by 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. 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 during the term in which all remaining requirements for the degree are to be met, but at least two 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 tool skills (languages, computer programming, statistics, and others approved 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.

Competence in Ancillary Skills
The requirement for competence in ancillary skills 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 an ancillary skill not related to the major in the sense of a minor.
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 ancillary areas independent of each other demonstrated to the satisfaction of 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 ancillary skills, 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.

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 Admissions and Records. 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 during the term in which all remaining re-
quirements for the degree are to be met, but at least two 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.
School of Humanities and Behavioral Sciences

Dean Roy L. Meek, B.A., M.A., Ph.D., Professor of Political Science

The humanities and behavioral 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 humanities, encompassing philosophy, literature, history, and the arts, 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 humanities is essential to a broad and sensitive awareness of man as he has been, is, and aspires to be.

The behavioral 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. Behavioral scientists perform a dual function, assembling complex masses of technical knowledge and attempting continual appraisal of the value systems in our society. The behavioral 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 Humanities and Behavioral 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, Slavic studies, or sociology. Besides these majors, courses are offered in Russian, Spanish, philosophy, communications, physical education, American studies, and linguistics.

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, foreign language and international trade, and recreation. These programs involve combinations of disciplines in the School of Humanities and Behavioral Sciences and the School of Administrative Science.

Graduate Programs
The School of Humanities and Behavioral Sciences offers Master of Arts degrees in English and history and an interdisciplinary graduate degree, the Master of Arts in developmental learning.

Humanities and Behavioral Sciences (HBS)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>The Art of Being Human</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>A humanistic approach to such important ideas as art, music, religion, love, and death, and their relevance to self-fulfillment and the good life.</td>
<td></td>
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<tr>
<td>231</td>
<td>Statistical Analysis</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Collection, classification, and presentation of data, measures of central tendency and dispersion, introduction to probability distribution and sampling theory, confidence limits and tests of significance, chi-square, and &quot;t&quot; distribution. Prerequisite: MA 105 or approval of instructor. (Same as BUS 231).</td>
<td></td>
</tr>
<tr>
<td>392</td>
<td>Engineering Ethics and Professional Behavior</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
</tbody>
</table>
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 201. 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 313, 364, or 357, and EC 341.

American Studies (AMS)

201 Introduction to American Studies 3 hrs.
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.

301 Special Topics in American Studies 3 hrs.
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.

401 Seminar in American Studies 3 hrs.
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.
Art Department

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

The Art Department 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 any 100-level art course, 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. Substantial amounts are required in some courses. Students who have funded support should include an amount for supplies 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 a student’s art work may be retained at the discretion of the art faculty to add to a permanent collection.

The art curriculum is multifaceted providing baccalaureate degree programs, art teacher certification, and an associate certificate program in interior design. The department also offers courses either to introduce or expand an individual’s skills in a selected media. The Bachelor of Arts degree requires specialization in either art history or one of 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 concentration in one of the following specialties: communication graphics, painting/mixed media, printmaking, or sculpture. Communication graphics 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 Art Department. Painting/mixed media includes courses in film making. The Associate Certificate Program in Interior Design is of two year’s duration and provides for a general university education and the specifics of this field. The curriculum involves design, design analysis, and introduction to space planning and programming. Technical development includes basic knowledge of structure, building systems equipment and components, and ability in communication skills.
Although work is progressing on an art curriculum expressly for non-majors, students are encouraged to consider various level art courses as electives. Development of one's human faculties and understanding through art is universally recognized.

Area of Concentration (AOC) with Art Major

Two basic patterns have been established for the degree candidate in art: the first is designed to be most helpful to the greatest number of students; the second is designed for students of exceptional ability.

1. Studio Specialty

Major in studio specialties (painting/mixed media, communication graphics, sculpture, and printmaking).

This program consists of 16 courses (48 semester hours) of studio work. It provides the basic vocabulary and two years of specialization in the chosen area. An area of cognate studies including art history or an art minor is suggested. The cognate studies or minor in art history must be made in consultation with the departmental adviser.

Lower Division Foundation Program (24 semester hours)—In the first two years all 100-level requirements should be completed. Any selections should be made in consultation with an Art faculty adviser. They are:

Design ................................................... 120 and 121
Sculpture .............................................. 140 and 141
Printmaking ............................................... 180
Drawing. Choose two of the following: ........... 160, 161, 162, 163, or 167
Photography .................................................... 165

Upper Division (24 semester hours)—A specialty should be chosen and an AOC declaration completed by the beginning of the junior year. In the junior year all three of the courses at the 300 level in the specialty should be completed.

Communication Graphics .................................. 330, 331, and either 332 or 333
Sculpture. Choose three of the following in consultation with professor: ........................................... 340, 341, 342, 343, 344 or 345
Painting/mixed media ........................................ 370, 372, and 374
Printmaking. Choose three of the following in consultation with professor: ........................................... 380, 381, 382, 383, 386, 387 or 388

Two elective studio courses at or above the 300 level outside the specialty are required. In the senior year the three courses at the 400 level in the declared specialty must be completed.

Sculpture .............................................. 440, 441 and 442
Communication Graphics .................................. 430, 431 and 432
Painting .................................................... 470, 471 and 472
Printmaking .................................................... 480, 481 and 482

It is suggested that no more than two studio courses be taken in any one term and that no other studio courses should be taken while completing senior requirements.

Art History, Minor or Cognate Studies—ARH 100 and 101 must be taken during the first two years. During the junior and senior years: (a) For the
minor, five courses in art history at the 300 level or above must be completed.

(b) For the cognate studies, three courses in art history at the 300 level or above and two courses in related disciplines approved by art history professor.

2. Art History Specialty

The art history major includes introductory courses in studio areas to provide insight into the creative experience. A 21 hour minor or group of cognate studies is required.

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 should be taken, one course from four of the five areas: photography, sculpture, printmaking, drawing, and design.

Upper Division Program (18 semester hours)—During the junior year three art history courses at the 300 level should be completed. Three seminar courses in art history at the 400 level or above should be completed during the senior year.

3. Studio Specialty with Teacher Certification

The program for teacher certification available to art degree candidates offers the qualifications for teaching only art in Alabama’s nursery through secondary schools. Note that the general education requirements differ somewhat from those for other B.A. degrees and a student interested in these programs must acquaint himself with the Education Department section of the catalog, where he will find detailed lists of GER, professional courses, and information relevant to the program outlined below.

Required Studio Courses:

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<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 370</td>
<td>Oil and Tempera Painting</td>
<td>3</td>
</tr>
<tr>
<td>ARS 382</td>
<td>Printmaking: Relief</td>
<td>3</td>
</tr>
<tr>
<td>ARS 383</td>
<td>Screenprinting</td>
<td>3</td>
</tr>
</tbody>
</table>

Advised electives (choose one)

- ARS 165 Photography (3 hrs.)
- ARS 372 Mixed Media: Replicative (3 hrs.)
- ARS 374 Mixed Media: Unique Object (3 hrs.)

(choose one)

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

Required Art History Courses:

- ARH 100 Art History Survey I (3 hrs.)
- ARH 101 Art History Survey II (3 hrs.)
Advised electives (choose three)

ARH 300 Colonial & 19th Century American Art (3 hrs.)
ARH 301 Classical (3 hrs.)
ARH 302 Medieval (3 hrs.)
ARH 303 Renaissance (3 hrs.)
ARH 304 20th Century [highly recommended] (3 hrs.)
ARH 306 Baroque (3 hrs.)
ARH 310 19th Century (3 hrs.)

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 two ways: (a) independent study 6 hours (Art 490, 491) in the candidate’s specialty, leading to a solo exhibition for the studio specialists or the presentation of a research paper at a seminar meeting in the last term of senior year for the art history specialists; or (b) 6 additional semester hours of work in art history scheduled by studio major or 6 additional semester hours work in studio scheduled by art history major.

Supportive Art Minor

A student primarily interested in another discipline who wishes to include courses in art history or in studio areas of art or both may select a program in either art history or in studio courses or in a combination totaling 21 semester hours, 6 of which must be upper level.

UAH Gallery of Art

The UAH Gallery of Art is housed in what was originally the Union Chapel of Hazel Green, Alabama. The building was donated to the university by Mr. and Mrs. Franklin Bendall in 1973, later transported to the UAH campus, and set on the original foundation stones. It was restored by volunteer labor of students and faculty. Approximately 3,000 hours of work went into the restoration of the simple Greek Revival structure to its original circa 1840 condition. The interior was redone to accommodate the strict needs of a professional museum. It is located on the campus between Morton Hall and the University Union adjacent to Bicentennial Park. The gallery is under the direction of an Art Department faculty member and 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.

UAH Visiting Artist Series

The Art Department sponsors campus visits each year of internationally renowned artists, critics, and art historians. Presentations include studio and classroom sessions as well as public lectures.

Some of the recent guests have been sculptors: 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 par-
participants. Art historians Barry Lewis and Elizabeth Gilmore Holt added depth to these programs as well as critic Donald Kuspit and painter Don Eddy, artist-architects James Wines and Michael McDonough, photographer Rena Small, conceptualist Jeanne-Claude Christo, and museum curators Marcia Tucker and Patterson Sims.

The FOCAL Annual Exhibition
The UAH student art organization, FOCAL, in conjunction with the Art Department sponsors the only statewide annual juried exhibition for Alabama college art students. More than $1,000 is available each year in prize money. The juror is always from outside the state. The exhibition each spring is displayed in the UAH Gallery of Art.

Art (ARH, Art History; ARS, Art Studio)

100 Art History Survey: Prehistoric Through Gothic Art 3 hrs.
Architecture, painting, sculpture, and decorative arts of the ancient and medieval worlds in relation to environment and social conditions of the times.

Art and architecture of the Western world from the fifteenth through the twentieth centuries in light of social change and emergence of the artist as an individual.

109 Art Appreciation for Non-Majors 3 hrs.
Major artists and monuments designed to acquaint the non-art major with the problems of how to review a work of art. Emphasis on major monuments, such as the Parthenon and Chartres and the major artists such as Rembrandt, Michelangelo, Picasso, and Pollock, showing how each expressed a different aspect of the world of which they are a part.

110 Art Encounters for the Non-Artist 3 hrs.
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.

120 Two-Dimensional Form in Design 3 hrs.
Fundamentals of handling and understanding two-dimensional design materials and processes.

121 Color in Design 3 hrs.
Physiological, psychological, and physical properties of color with experimental studio work in subjective and objective evaluation of color usage.

140 Sculptural Use of Organic Materials 3 hrs.
Introduction in clay to three-dimensional form and space, practice in mold-making and casting techniques, and the use of hydrocal materials as constructive material.

141 Sculpture: Metal Assemblage 3 hrs.
Welded metal as sculpture-oxyacetylene and arc-welding.

160 Drawing with Dark-on-Light Media 3 hrs.
Two-dimensional form and expression through use of traditional means of line, value, texture, composition, perspective, and scale.

161 Drawing with Fluid Media 3 hrs.
Use of inks, washes, oils, gouache, airbrush, batik, and related media.
162 Drawing with Light-on-Dark Media 3 hrs.
Use of light drawing materials (chucks, pastels, oil paints) with emphasis on representa-
tion and nonlinear perspective. Recommended as preparation for oil painting.

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.

165 Photography for Drawing and Design 3 hrs.
Understanding and practice of photography through its use as a creative drawing and
design medium. Owning photographic equipment not required. Required course for
studio art majors.

167 Drawing and Rendering for Illustration (same as ID 167) 3 hrs.
Drawing techniques for illustration. Investigation in expressive and objective drawing
styles in professional media. Freehand sketching, perspective studies, rendering techni-
ques, and composition in line, form, value, and color. Recommended for communica-
tion graphics specialists.

180 Introduction to Printmaking 3 hrs.
Basic printmaking techniques. Printmaking process generating ideas and images.
Monoprint, collagraph, and nontraditional approaches to printmaking.

215 Art for Elementary Teachers 3 hrs.
Art methods and media presented by lecture, demon-
stration, discussion, reading, and
studio experience for elementary school teachers.

260 Intermediate Drawing Workshop 3 hrs.
Synthesis of previous drawing experiences into complete visual statements. Drawing ex-
perience preferred. Course does not satisfy Art Department core requirements but is
recommended for art majors.

265 Intermediate Photography Workshop 3 hrs.
Personal exploration of photography as a fine arts medium with emphasis on produc-
tion of art works. ARS 165 or other basic photographic experience preferred. Course
does not satisfy Art Department core requirements. Lab fee: Level 2.

270 Intermediate Painting Workshop 3 hrs.
Studio practice in painting. Development of individual creative expression. Painting
and drawing experience recommended. Course does not satisfy Art Department core re-
quirements. Lab fee: Level 1.

Upper Division

300 Colonial and Nineteenth Century American Art 3 hrs.
The arts before World War I. Focus on development of a unique national style depen-
dent on European prototypes. Jefferson, Copley, Cole, and Whistler. Prerequisite:
ARH 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 ideal. Prerequisite: ARH 100 or approval of instructor.

302 Medieval Art 3 hrs.
Influence of Christianity on art of the Western world expressed in Early Christian,
Romanesque, and Gothic architecture, sculpture, and painting. Prerequisite: ARH 100
and 101 or approval of instructor.

303 Renaissance Art 3 hrs.
Visual arts of northern and southern Europe from 1250 to 1550. Italy, the rise of the artist
as a creative individual, and his expanding role in society. Jan van Eyck, Michelangelo, and Titian. Prerequisite: ARH 100 and 101 or approval of instructor.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>304</td>
<td>Twentieth Century Art</td>
<td>3 hrs.</td>
<td>A survey of the trends in Europe and America from 1890 to the present day. The movements of cubism, fauvism, and expressionism, and artists such as Picasso, Matisse, and Pollock. Prerequisite: ARH 100 and 101 or approval of instructor.</td>
</tr>
<tr>
<td>306</td>
<td>Baroque Art</td>
<td>3 hrs.</td>
<td>Development of baroque and rococo art in Europe. Attention to Rubens, Bernini, Rembrandt, Velasquez, and Poussin. Prerequisite: ARH 100 and 101 or approval of instructor.</td>
</tr>
<tr>
<td>309</td>
<td>Period Styles in Interior Design</td>
<td>3 hrs.</td>
<td>Historical development of European and American period styles including contemporary trends. Architectural styles considered as background for related styles of furnishing. (Same as ID 309).</td>
</tr>
<tr>
<td>310</td>
<td>Nineteenth Century Art in Europe</td>
<td>3 hrs.</td>
<td>Survey of developments from 1760 to 1890: classicism, romanticism, realism, and impressionism in works of David, Goya, Courbet, Degas, and others. Prerequisite: ARH 100 and 101 or approval of instructor.</td>
</tr>
<tr>
<td>330</td>
<td>Fundamentals of Advertising Design</td>
<td>3 hrs.</td>
<td>Tools, techniques, and practices of professional graphic designer. History of lettering design with studio practice in functional lettering techniques. Prerequisite: ARS 120 or 121 or approval of instructor.</td>
</tr>
<tr>
<td>331</td>
<td>Advertising Layout and Typographic Design</td>
<td>3 hrs.</td>
<td>Photographic and art imagery in visual layout design. Contemporary design and usage with studio practice in layout media of the professional designer. Methods of preparation of art for reproduction in color and black and white. Prerequisite: ARS 120 or 121 or approval of instructor.</td>
</tr>
<tr>
<td>332</td>
<td>Illustration in Black and White</td>
<td>3 hrs.</td>
<td>Design and production of one-color art for print media using ink, ink wash, pencil, and commercial drawing materials and techniques. Publication experience in offset and letterpress. Prerequisite: ARS 120, 160, and 167 or approval of instructor.</td>
</tr>
<tr>
<td>333</td>
<td>Illustration with Color</td>
<td>3 hrs.</td>
<td>Design and preparation of full color imagery for mass media using gouache, colored ink, and acrylic mediums. Graphic arts production techniques needed for color reproduction. Prerequisite: ARS 120, 121, 161 or approval of instructor.</td>
</tr>
<tr>
<td>340</td>
<td>Sculptural Use of Thermoset Plastics</td>
<td>3 hrs.</td>
<td>Sculptural manipulation of thermoset resins and foams. Prerequisite: ARS 140 or approval of instructor.</td>
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<tr>
<td>341</td>
<td>Sculptural Use of Thermoplastics</td>
<td>3 hrs.</td>
<td>Manipulation of thermoplastics by bonding, dying, forming, and welding. Prerequisite: ARS 140, 141 or approval of instructor.</td>
</tr>
<tr>
<td>342</td>
<td>Sculpture: Investment Casting</td>
<td>3 hrs.</td>
<td>The lost-wax method of producing cast metal sculpture. Creation of sculpture in wax, investment of these waxes in refractory molds, and casting in bronze and aluminum. Prerequisite: ARS 140 and 141 or approval of instructor.</td>
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<tr>
<td>343</td>
<td>Sculpture Workshop</td>
<td>3 hrs.</td>
<td>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. Prerequisite: ARS 140 and 141, and one or more of the 300-level courses in sculpture and approval of instructor.</td>
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</tbody>
</table>
344 Sculpture: Carving 3 hrs.
Manipulation of three-dimensional forms by means of subtractive technique. Work in both stone and wood. Prerequisite: ARS 140 or 141 or approval of instructor.

345 Sculpture: Sand Casting of Metal 3 hrs.
Bonded-sand casting and industrial foundry practices. Prerequisite: ARS 140 and 141 or approval of instructor.

370 Oil and Tempera Painting 3 hrs.
Brush painting on canvas and panels with both oils and temperas (acrylics, etc.), using both representational and nonobjective imagery. Prerequisites: One of ARS 120 or 121 and one of ARS 160, 161, 162, 163, or approval of instructor.

372 Mixed Media (Replicative) 3 hrs.
Basic studio practice and understanding of modern mass replicating media: film, sound, and TV. Prerequisite: one of ARS 120, 121, and one of ARS 160, 161, 162, 163, or approval of instructor.

373 Painting 3 hrs.
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 painting specialty.

374 Mixed Media (Unique Object) 3 hrs.
Painting with combination of media normally used separately or outside painting process. Simple paint combination or shaped canvasses to 3-D construction, machines, sound, light projection or transmission, and events. Prerequisite: one of ARS 120, 121 and one of ARS 160, 161, 162, 163, or approval of instructor.

380 Printmaking: Intaglio 3 hrs.
Beginning studio practice in etching and engraving. Prerequisite: ARS 180; ARS 120 or 121 and one of ARS 160, 161, 162, 163, or approval of instructor.

381 Printmaking: Stone Lithography 3 hrs.
Beginning studio practice in lithography. Prerequisite: ARS 180; ARS 120 or 121 and one of ARS 160, 161, 162, 163, or approval of instructor.

382 Printmaking: Relief 3 hrs.
Beginning studio practice in relief-print media, utilizing woodcut, wood-engraving, linoleum-related relief techniques. Experimental media in color and black and white. Hand and mechanical press usage. Prerequisite: ARS 180; ARS 120 or 121; and one of ARS 160, 161, 162, 163, 167 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. Prerequisite: ARS 180; ARS 120 or 121; and one of ARS 160, 161, 162, 167 or approval of instructor.

386 Printmaking: Workshop 3 hrs.
An opportunity to continue printmaking work in an area in which student has gained some degree of skill. An understanding of the development of concept in the print image along with technical competence. Prerequisites: ARS 180 and one 300 level printmaking class or approval of instructor.

387 Printmaking: Aluminum-Plate Lithography 3 hrs.
Basic hand-drawn techniques and photo processes in aluminum-plate lithography. Prerequisite: ARS 180, ARS 120 or 121 and one of ARS 160, 161, 162, 163, 167 or approval of instructor.
Printmaking: Advanced Intaglio

Exploration of photo techniques and color intaglio methods. Stencil, multiple plate, reduction, and viscosity techniques. Prerequisite: ARS 380 or approval of instructor.

Senior-level courses involve independent initiative of degree candidate. He should have completed all foundation courses and all GER before commencing senior program.

Courses 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. Prerequisite: ARH 100, 101 and upper division course covering area of art under investigation ARH 303, 305, or 306.

Art History Seminar: Modern Art

Methods of developing a scholarly research paper. Prerequisite: ARH 102 and 304 or 310.

Art History Seminar: American Art

Methods of developing a scholarly research paper. Prerequisite: ARH 100, 101, 102, and 300.

Trends in Post-1945 Art

Contemporary developments in depth in the visual arts. Prerequisite: ARH 100, 101, and 304 or approval of instructor.

Art History Seminar: The Literature of Art History

Important theoretical and critical writings on visual arts to acquaint 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. Prerequisite: ARH 100, 101, 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 from the Middle Ages to the present. Prerequisite: ARH 100, 101, and 300, 304, 306 or 310 or approval of instructor.

Individual content of the following courses to 490 is by consultation. Prerequisite: senior standing.
481 Advanced Studio Problems in Printmaking 3 hrs.
482 Advanced Studio Problems in Printmaking 3 hrs.
490 Independent Study 3 hrs.
Independent study in art history leading to presentation of a research paper at seminar meeting or independent work in studio specialty leading to a one-man exhibition in last term of senior year. Course must be followed by ARS 491.
491 Independent Study 3 hrs.
Independent study in art history leading to presentation of a research paper at seminar meeting or independent work in studio specialty leading to one-man exhibition in last term of senior year. Prerequisite: ARS 490.
495 Technical Problems 3 hrs.
Technical problems in specific studio areas for which advanced course sequences in a studio field are not available. Course based on introductory work in studio area involved. Course can be repeated for a total of 6 hours credit. Prerequisite: advanced standing and course work or equivalent experience in studio area concerned and permission of instructor and department chairman.
500 Special Problems in Art History 3 hrs.
Directed reading and research. Prerequisite: advanced standing, 12 semester hours of art history, previous course work in area to be studied, and approval of instructor.

Associate Certificate Program in Interior Design

The Associate Certificate in Interior Design is composed of specialized courses designated by the prefix ID and supporting courses in art history and studio areas. The curriculum is intended for persons preparing for work in an associate capacity in interior design and for those desiring personal enrichment. Course requirements can generally be completed in two years. Credit earned in the Associate Certificate Program may also be used where applicable toward fulfilling requirements for a bachelor’s degree, and students completing the associate certificate are encouraged to continue work toward the baccalaureate.

General Requirements

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 interior design curriculum, and the remaining hours in free electives; (2) an overall average of C in all courses and all specialty courses attempted.

Transfer students must earn at least 18 semester hours at UAH including 6 hours in the interior design curriculum and must complete 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 courses in the Interior Design Program at UAH.

Up to 30 semester hours of the total requirements for the associate certificate may be earned by means other than classroom work (e.g., CLEP, credit by examination, correspondence study, educational experiences in the armed forces, and professional certificate programs).

General Education Requirements 24-26 hrs.

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) English, modern foreign languages, philosophy, music, or art courses or subject examinations, or (b) CLEP humanities examination.

Students who intend to continue their studies toward the baccalaureate are cautioned to 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 at UAH.

Interior Design Curriculum 30 hrs.
The following courses are required: ID 101, 102, 201, 202, 203, 301, ARH 101, and 309, ARS 121, and 167.
Other courses may be substituted with permission from the chairman of the Art Department.

Electives 4-6 hrs.

Interior Design (ID)

101 Fundamentals of Home Furnishings 3 hrs.
Furnishings for the home. Design terms and styles of furniture. Basic decoration methods: furniture arrangement, elements of color, window treatment, accessories, and lighting. Customer buying of furniture, floor coverings, fabrics, and wall coverings.

102 Introduction to Interior Decoration 3 hrs.
Principles and practices of interior decoration. Activities and space planning, principles of design, color theory and schemes, interior materials, and design of major interior elements. Examination of the whole house including floor and furniture arrangements, exterior considerations, and cost factors. Prerequisite: ID 101 or permission of coordinator.

167 Drawing and Rendering 3 hrs.
Drawing techniques for illustration in interior decoration. Investigation in expressive and objective drawing styles in professional media. Freehand sketching, perspective studies, rendering techniques, and composition in line, form, value, and color. (Same as ARS 167).

201 Introductory Architectural Planning 3 hrs.
Architectural planning and drawing primarily relating to interior decoration. Basic drawing and sketching, planning processes for home and light commercial buildings, construction materials, and elements of construction methods. Introduction to preparation of architectural drawings.

202 Interior Decoration Problems 3 hrs.

203 Textiles 3 hrs.
Textiles, emphasizing fibers, yarns, fabric construction, and finishes in relation to use,
serviceability, and care of household fabrics. Prerequisite: ID 101 or approval of instructor.

301 Advanced Residential and Commercial Planning 3 hrs.
Advanced development of skills in residential and commercial planning and drawing relating to interior design. Prerequisite: ID 201 or approval of instructor.

309 Period Styles 3 hrs.
Illustrated survey of historical development of period styles, European and American including contemporary trends. Styles of architecture are considered as background for related styles of furnishings. (Same as ARH 309).
Communication Program

Assistant Professors Goodall, Roach (coordinator), Webb; Adjunct Assistant Professors James, Pennington; Adjunct Instructors Beach, Hughes, Kaylor, McCauley.

Communication is an interdisciplinary program offering a minor in communication with options in drama, interpersonal and organizational communication, mass media, and speech.

The program seeks to provide the student with knowledge of the nature of human communication, symbols systems by which it functions, environment in which it occurs, and its effects.

Communication Minor

A minor in communication should 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 three courses (113, 130, 330), three additional courses from the desired option (drama, interpersonal and organizational communication, mass media, and speech) and the other course or courses from the remainder of the Communication Program or related disciplines.

Appropriate communication courses may also be used to form part of a program of cognate studies with other disciplines.

Options

Drama

The arts of theatrical production from the playwright's text to the performance.

b. Option: CM 122, 221, 322, or 422 .............................. 9 hrs.
c. Electives .................................................... 3 hrs.

Interpersonal and Organizational Communication

Processes by which human talk and action are created, managed, and evaluated in one-to-one, group, and public situations.

b. Option: CM 310, 311, 350, or 450 .............................. 9 hrs.
c. Electives .................................................... 3 hrs.

Mass Media

Forms and influences of communication generated for public audiences.

Journalism

Writing, editing, news judgement for persons in news media professions, marketing, and public relations. Typing recommended.

b. Option: CM 201, 202, 301, or 430 .............................. 9 hrs.
c. Electives .................................................... 3 hrs.

Broadcasting

Message information and transmission for radio and television.

Core courses, CM 113, 130, 330, and CM electives may be taken at UAH.
Courses for the option are available through UAH-A&M Visiting Student Program.

Nine hours must be taken from CM 230 or TEL 202, 212, or 304. If TEL 304 is not chosen, the elective must be from courses numbered 300 or above. CM 430 is recommended.

**Speech**
Rhetorical communication with emphasis on effective speaking and listening skills.

a. Core courses: CM 113, 130, 330 ........................................ 9 hrs.
b. Option: CM 110, 214, 310, 311, or 430 .......................... 9 hrs.
c. Electives ..................................... . . ........... . . 3 hrs.

Note: CM 110, 113, and 214 satisfy requirements for teacher certification. CM 113 is required for business majors.

### Communication (CM)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>110</td>
<td>Voice and Diction</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Introductory course on language, speech, and hearing. Development of individual vocal skills.</td>
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<tr>
<td>113</td>
<td>Basic Speech Communication</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Study and practice of intrapersonal, interpersonnal, and public communication skills. Development of communication competence and rhetorical sensitivity.</td>
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<tr>
<td>122</td>
<td>Play Production</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Active student participation in production of a play. Performance, and all component parts (scenery, costumes, make-up, and lighting) by students under direction of instructor.</td>
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<tr>
<td></td>
<td>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).</td>
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<tr>
<td>131</td>
<td>Survey of Communication Techniques</td>
<td>3 hrs.</td>
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<td></td>
<td>Technologies employed in print media, photography, radio, television, and multimedia communications. Basic understanding of the interrelationships and interdependencies of the media techniques. Prerequisite: CM 113, 130</td>
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<tr>
<td>201</td>
<td>Journalism I</td>
<td>3 hrs.</td>
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<tr>
<td>202</td>
<td>Journalism II</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Reporting skills in specialized areas of local government, police, courts, and education. Prerequisite: CM 201 or approval of instructor.</td>
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<tr>
<td>214</td>
<td>Oral Interpretation</td>
<td>3 hrs.</td>
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<td></td>
<td>Study and practice in intellectual, artistic, and communicative skills required to read prose, poetry, and drama aloud effectively. Participation in a group performance. Prerequisite: CM 110, CM 113, or approval of instructor.</td>
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<tr>
<td>221</td>
<td>Acting</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
</tbody>
</table>
Origins of broadcast industry in this country, its development, management, and relationship to other industries. Business functions of commercial radio and television broadcasting including effect of government regulations. Prerequisite: CM 130 or CM 131 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.

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 Western social, political, and intellectual history. Prerequisite: CM 113.

311 Interviewing: Theory and Technique 3 hrs.
Study and practice of interviewing skills. Development of ability in selection, counseling, and information-seeking interviews. Prerequisite: CM 113.

322 Theater History 3 hrs.
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. Prerequisite: CM 122 and sophomore standing or approval of instructor.

330 Communication Theory and Research 3 hrs.
Rhetorical theory from the Greeks to the present. Development of a communicative model of man as active shaper of his own knowing, being, and doing. Prerequisite: CM 113 or approval of instructor. (Same as PY 330).

350 Organizational Communication 3 hrs.
An industrial-simulation training program for management executives interested in dramatically improving their understanding and ability to lead and participate in group assignments commonly encountered in the modern corporation. Prerequisite: CM 113 or approval of instructor.

422 Directing for the Theater 3 hrs.
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.

430 Law of Mass Communication 3 hrs.
Evolution and current status of legal thought and doctrine concerning freedom of expression in speech, print, and broadcasting. Issues of obscenity, censorship, and the “fairness doctrine.” Prerequisite: CM 130 or approval of instructor.

450 Administrative Communication 3 hrs.
A pragmatic application of scientific and humanistic principles of effective communication for administrators. Management of interpersonal relations with subordinates, use of agendas to conduct meetings, leadership skills, and techniques for presentational speaking. Prerequisite: CM 113 or permission of instructor.

The following courses under the Broadcasting option are taught at A&M and are available through UAH-A&M Visiting Student Program:

TEL 202 TV Production and Direction 3 hrs.
Fundamentals of TV production including the electronic equipment, TV cameras,
optics, sound, lighting, staging, and directoral techniques. Basic experience in TV
studio operations and program production. Prerequisite: CM230.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEL 212</td>
<td>Writing for Broadcasting</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Fundamentals of writing and adapting literature for television and radio.</td>
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</tr>
<tr>
<td>TEL 304</td>
<td>Advanced Television Production</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Laboratory in development of types of TV production. The writing, producing, budgeting, and directing of a TV program of considerable length in a category other than drama. Emphasis on program idea and design.</td>
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</tr>
</tbody>
</table>
Criminal Justice Program

Adjunct Assistant Professors Accardi, Vizzini

Area of Concentration 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, 103, HBS 231 (statistics), 320, 400, and a minimum of 15 semester hours of courses numbered 300 or above.

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 that of criminal justice. Strongly recommended disciplines are psychology, sociology, political science, history, or management. At least 6 hours in the minor must be in courses numbered 300 or above. 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.

Freshmen considering a major in criminal justice should consult with a faculty adviser in the program during their freshman year. GER should include MA 105 (College Algebra) unless placement tests indicate Level II or above. 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. 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.

The criminal justice major incorporates three options, one of which must be chosen by the student in addition to the 15-hour core curriculum: CJ 101, 103, HBS 231, 320, and 400.

Criminology Option
Choose 21 hours: CJ 201, 301, 303, 304, 315, and either CJ 450 or 6 hours of criminal justice electives.

Corrections Option
Choose 21 hours: CJ 202, 301, 303, 305, 420, and either CJ 450 or 6 hours of criminal justice electives.

Criminal Justice Administration Option
Choose 21 hours: CJ 303, 304, 305, 315, 420, and either CJ 450 or 6 hours of 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.
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 103, CJ 201, 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 202, SOC 320, and SOC 420.

Electives ................................................................. 4-6 hrs.

Other courses may be substituted with permission from the Criminal Justice Program coordinator.

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.
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Introduction to the American Criminal Justice System</td>
<td>3 hrs.</td>
<td>Survey of the criminal justice system, including philosophical and historical background.</td>
</tr>
<tr>
<td>103</td>
<td>Introduction to the American Court System</td>
<td>3 hrs.</td>
<td>Structure, jurisdiction, procedures, and impact of the courts in administration of justice. Prerequisite: CJ 101, or approval of the instructor.</td>
</tr>
<tr>
<td>201</td>
<td>Criminal Investigation</td>
<td>3 hrs.</td>
<td>Techniques, methods, and procedures used in investigation of crime. Prerequisite: CJ 101-103.</td>
</tr>
<tr>
<td>202</td>
<td>Community-Based Corrections</td>
<td>3 hrs.</td>
<td>Correctional problems and practices. Emphasis on alternatives to correctional incarceration. Prerequisite: CJ 101-103.</td>
</tr>
<tr>
<td>203</td>
<td>Introduction to Criminology</td>
<td>3 hrs.</td>
<td>Survey of the scientific approaches to criminal investigation. Laboratory operations and techniques. Prerequisite: CJ 101 and 201.</td>
</tr>
<tr>
<td>302</td>
<td>Correctional Counseling Supervision</td>
<td>3 hrs.</td>
<td>Analysis, selection, and implementation of treatment approaches and techniques used with offenders in probation, parole, and corrections. Prerequisite: CJ 202 or approval of the instructor.</td>
</tr>
<tr>
<td>303</td>
<td>Criminal Law</td>
<td>3 hrs.</td>
<td>Substantive criminal law, including sources, principles, types of offenses, and responsibility.</td>
</tr>
<tr>
<td>304</td>
<td>Criminal Procedure</td>
<td>3 hrs.</td>
<td>Procedure that controls judicial process in criminal cases from arrest to review of convictions, including consideration of constitutional rights and limitations. Prerequisite: CJ 303.</td>
</tr>
<tr>
<td>305</td>
<td>Probation, Parole, and Pardons</td>
<td>3 hrs.</td>
<td>Analysis and evaluation of procedures for release of convicted law violators from historical, philosophical, sociological, and legal perspectives.</td>
</tr>
<tr>
<td>320</td>
<td>Criminal Behavior</td>
<td>3 hrs.</td>
<td>Theories of criminal behavior and criminal control procedures. Causation, criminal and chancery laws, and crime control by police, criminal and juvenile courts. (Same as SOC 320).</td>
</tr>
<tr>
<td>399</td>
<td>Directed Study in Criminal Justice</td>
<td>1-3 hrs.</td>
<td>Independent studies in an area of criminal justice selected in consultation with a faculty adviser. Prerequisite: approval of chairman.</td>
</tr>
</tbody>
</table>
Courses listed below are open to students who have completed 15 hours of criminal justice or have senior standing.

400  Seminar in Criminal Justice  
3 hrs.  
Research, writing, projects, and special studies in criminal justice. Open only to seniors and required of all students majoring in criminal justice.

401  Contemporary Issues in Criminal Justice  
3 hrs.  
Contemporary problems in criminal justice. Legal aspects of law enforcement.

404  Criminal Evidence  
3 hrs.  
Nature of evidence, rules of evidence, and collection, preservation, and admission of evidence in courts of law.

420  Corrections and Rehabilitation  
3 hrs.  
Analysis of social variables involved in restructuring behavior of the social offender. Problems faced by correctional institutions. (Same as SOC 420).

450  Field Placement  
6 hrs.  
Practice work in an agency or institution involved in administration of justice. Permission of the Criminal Justice faculty required.
Developmental Learning Program

Professor Wharry, Assistant Professor Stewart (coordinator), Adjunct Assistant Professor Haralick, Adjunct Instructor Bell.

The interdisciplinary program in developmental learning provides for an Associate Certificate in Child Development, a composite major with emphasis in human growth and development, and a master's degree in developmental learning that will provide an Alabama Class A Special Education Professional Certificate in Learning Disabilities, Early Childhood Education for the Handicapped or School Psychometry. A prerequisite to the Class A certificate is eligibility for Class B professional certificate. The program prepares the individual to understand the human organism as it grows and develops within societal structures, to conduct research in human learning, and to deal with children and adults who have learning problems.

It is general enough to provide the student with opportunities to study the total developmental process and to see how that process is affected by the physiological, psychological, sociological, and educational factors that impinge on the human organism. The Associate Certificate in Child Development provides training for persons who wish to serve as aides in schools, senior-citizen and day-care centers. The undergraduate program in human growth and development (composite major) emphasizes career opportunities in public and private agencies as well as specialized human service organizations. The graduate program in developmental learning provides training for people who wish to become remedial or diagnostic specialists, resource or special class teachers with private or public schools, or specialists who work with medical professionals or wish to direct clinical programs.

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, biology, 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, 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 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.

Undergraduate 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, HBS 231, PY 300, SOC 310, SOC 311, PY 315, PY 316, PY 510
Electives. 9 hrs. from the following: ......................... CD 102, SOC 306, PY 317, PY 318, 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, HBS 231, SOC 311, PY 315
Electives. 9 hrs. from the following: ......................... CD 102, PY 300, SOC 306, SOC 310, PY 316, PY 317, PY 318, SOC 345, PY/SOC 375, PY 401, PY 433, PY 506, PY 510
Graduate Program in Developmental Learning

The interdisciplinary program in developmental learning prepares persons to deal with children and adults who have learning problems and to do research in human learning.

It is general enough to provide the student with opportunity to study the total developmental process and see the way in which that process is affected by physiological and emotional facts 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 the public schools, or specialists who work with pediatricians, psychologists, ophthalmologists, or optometrists and who wish to direct clinical programs.

The developmental learning program provides an Alabama Class A Special Education Professional Certificate with endorsement in learning disabilities or early childhood education for the handicapped or school psychometry. A prerequisite to the Class A certificate is eligibility for a Class B professional certificate.

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. (See p. 96)

Program Alternatives

Early Childhood Education for the Handicapped leading to Class A certification:
Core: ......................................... DL 593, DL 610, DL 630
Professional specialization: ...... DL 601, DL 604, DL 605, DL 606, DL 626
                                   DL 640, DL 650(01)
Electives: 3 hrs. from .............. DL 600, DL 602, DL 603, DL 625,
                                   DL 628, DL 629 or DL 649

Learning Disabilities leading to Class A Teacher Certification.
Core: ......................................... DL 593, DL 610, DL 630
Professional specialization: ...... DL 602, DL 604, DL 606, DL 625, or DL 626,
                                   DL 627, DL 640, DL 650(02)
Electives: 3-6 hrs. from any non-required course in the developmental learning graduate program.

School Psychometry leading to Class A certification
Core: ......................................... DL 593, DL 630
Professional specialization: ...... DL 620, DL 625, DL 626, DL 627,
                                   DL 628, DL 631, DL 640, DL 650(03).
Electives: 3-6 hrs. from any non-required course in the developmental learning graduate program.

Early Childhood Learning
Core: ......................................... DL 610, DL 630

Developmental Processes
Core: ......................................... DL 610, DL 630
Professional specialization: ...... DL 601, DL 602, DL 606, DL 628, DL 629
and one diagnostic course. Thesis or DL 603 and DL 626
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)**

593 *Education of Exceptional Children and Youth* 3 hrs.
Introduction to the field of exceptional children and youth including observations. (Same as ED 593)

600 *Special Problems in Developmental Learning* 3 hrs.
Independent study, special projects, and in-service programs. Elective only

601 *Early Childhood Development* 3 hrs.
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 practicum.
602 Psychopathology of Children with Learning Problems 3 hrs.
Symptoms and learning theory as related to children with learning problems. Observation and participation practicum.

603 Sensory-Motor Readiness in Children 3 hrs.
Early learning process in children from birth to six years of age; techniques and sequential approaches to sensory-motor training on a developmental basis. Participation practicum.

604 Adaptive Academics 3 hrs.
Sequential and veridical approach to making adaptions in academic areas so that programs can be developed to help individuals who can learn best through adaptive and concrete procedures. Participation practicum.

605 Curriculum for Early Childhood Education 3 hrs.

606 Language Development 3 hrs.
Stages of language development. Techniques for stimulating language development and communication skills in the young child. Practicum.

609 Fundamentals of Reading for Middle and Secondary Schools 3 hrs.
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. Elective for LD students who have not completed a course in reading methods. (Same as ED 609).

610 Interdisciplinary Aspects of Intervention 3 hrs.
Psychological and sociological aspects of learning. Multidisciplinary approach to learning and problems that require intervention. Involvement of professionals in the community immediately concerned with these problems in a particular discipline. Observation practicum.

620 Psychoeducational Counseling 3 hrs.
Application of microteaching, microcounseling and psychoeducational concepts for school psychologists and teachers of children with developmental disabilities.

625 Diagnostic Procedures: Advanced Psychometrics 3 hrs.
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. Observation practicum.

626 Diagnostic Procedures: Selected Tests for Preschoolers 3 hrs.
Practicum in administration, interpretation, and use of selected tests for school-age children. Minimal level of competency will be defined that all students will be required to master. Prerequisite: DL 603 (LD) or DL 605 (ECEH).

627 Diagnostic Procedures: Selected Tests for School-Age Children 3 hrs.
Advanced practicum in administration, interpretation and use of selected tests for elementary school children. Minimal level of competency will be defined that all students will be required to master. Prerequisite: DL 604.

628 Human Learning Theory 3 hrs.
Approaches to human learning. Description of behavioral changes commonly called "learning," as well as closely related behavioral phenomena such as transfer, retention, and stimulus generalization. Interrelationships between these behavioral changes and areas such as motivation, perception, personality, and neurophysiology. Examples of application of learning principle of learning problems of children and adults.
Behavior Modification 3 hrs.
Psychological principles concerning control of human behavior and current theoretical experimental research in behavior modification.

630 Statistics and Methodology 3 hrs.
Research methodology including overview of experimentation, simple data presentation, normal probability vs. non-normal distribution, correlation, and reliability and validity. Concept and actual work-type situations. Prerequisites: HBS 231.

631 Diagnostic Procedures: Stanford-Binet, Wechsler 3 hrs.
Practicum in administration, interpretation, and use of intelligence tests. Minimal level of competency will be defined that all students will be required to master. Prerequisite: HBS 231 or DL 630, DL 625, DL 626 or DL 627, and permission of instructor.

640 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 intrafamilial relationships. Intervention programs for families and their handicapped and non-handicapped children.

644 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.

649 Individual Readings 3 hrs.
Supervised readings in depth in area of particular interest to the student. Prerequisite: approval of instructor.

650 Practicum 3 hrs.
Experiences working with children's learning patterns and deviations on an individual basis. Two hundred clock hours minimum requirement.
650(01) - Early Childhood Education for the Handicapped Practicum
650(02) - Learning Disabilities Practicum
650(03) - Psychometric Practicum

699 Master's Thesis 3 hrs.
Requirement each term student is working and receiving direction on his master's thesis. Minimum of two terms required. Maximum of 9 hours' credit for successful completion of master's thesis.
Education Department
Professor Wharry; Professor Emeritus Engle; Professors Brindley, Gibson, Kilgo; Assistant Professors Butts (chairman), Shiver; Adjunct Assistant Professor Oliver.

Philosophy of Teacher Education
The philosophy, and the curricula, of UAH programs in professional education are virtually unique in the state because of the emphasis placed upon a strong general education base and upon in-depth work in the chosen subject-matter field(s). In this regard we have a strong commitment to the traditional liberal arts model and education is, consequently, a service program to all of the arts and sciences. In both graduate and undergraduate preparation of educational personnel, the education program is viewed as rigorous study aimed at developing highly qualified and competent public and private high school, middle and elementary school teacher/educators. In teaching we aspire to excellence, adaptability, and utility; in research, we strive to contribute to an expanding body of knowledge which serves as a base for the teaching-learning process; and, in service we provide, well-trained, well-educated leaders, as well as, cooperative services to area schools, and we attempt to capitalize on UAH’s position as a scientific/technological institution in providing adaptive services to meet emerging needs in public and private education. Our liberal arts base will also assure that we give full measure to the humanities, to the arts, and to abiding traditions.

Undergraduate Study in Education
Students in the School of Administrative Science, the School of Humanities and Behavioral Sciences, or the School of Science and Engineering, who wish to qualify for the Alabama Class B elementary, middle, high school or N-12 professional teachers certificate must meet 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 academic adviser as early as freshman year. Student must also counsel with adviser from other approved academic departments to coordinate planning of programs of study.

Accreditation of Programs
The teacher education programs listed in this catalog are presently approved by the State Department of Education and the Southern Association of Schools and Colleges. At the time this is written, however, all teacher education programs are undergoing review for re-accreditation under a revised State Department of Education set of standards. As a consequence of this process, curricula, levels of certification, and admission and retention regulations may be changed. Students will be provided with catalog addenda advising them about new offerings and regulations effective fall term 1981. Teacher education programs may also be subject to further modifications as a result of State Board of Education resolutions. (Students should seek counseling from the Department of Education regarding this matter.)

Admission to the Teacher Education Program
During winter or spring term of the sophomore year, students should apply for admission to the Teacher Education Program with the Education Depart-
ment. Transfer students who have completed two years of undergraduate study must submit the application upon completion of 9 semester hours of work. Applicants should (1) have a cumulative QPA of 1.20 on all work attempted, (2) have completed at least 70 percent of the GER, (3) have presented acceptable confidential evaluations prepared on proper forms, (4) have satisfactory performance on a written and spoken English competency examination, (5) have satisfactory interview(s) with representatives of the Department of Education, and (6) have a minimum score of 16 on the ACT. Students may elect to be re-examined. All students admitted to the program will have a teacher education adviser assigned to them.

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 assignment for one term of the senior year. The following additional criteria must be met before the student teaching assignment is made: (1) GPA of 1.20 in all work attempted and a GPA of 1.20 in all work attempted in the major field, (2) a GPA of 1.20 in all work attempted in education courses, and (3) satisfactory completion of all appropriate GER’s.

Application for Teacher Certification
Near the end of the Teacher Education Program, the student should complete the 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 requirements, must satisfactorily complete the approved program with at least a 1.20 GPA on all work attempted and at least a 1.20 GPA on all work attempted in the teaching field and in professional education.

Professional Elementary Education Curriculum (PEEC)
The curriculum in elementary education is planned to provide a broad liberal education base and an in-depth study of a single discipline to prepare the elementary teacher for the master-teacher and team-teaching role in the elementary schools. See Accreditation of Programs section above.
Because of the scope of the PEEC, student must advise the Education Department Office his goal in elementary education as early as possible. The student will be assigned an adviser to aid him in planning an efficient course of study. This planning requires the student also to seek counseling from an adviser in the department of the student’s second area of study.
A student’s second area of study determines whether he is working toward a B.A. or a B.S. degree. Upon successful completion of the PEEC, the student is eligible for the Alabama Class B Elementary Professional Teachers Certificate.

General Education Requirements

<table>
<thead>
<tr>
<th>Humanities and Behavioral Sciences</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman composition (EH 101-102 or 103-104)</td>
<td>6</td>
</tr>
<tr>
<td>Literature</td>
<td>6</td>
</tr>
<tr>
<td>Speech (CM 110, 113 or 214)</td>
<td>3</td>
</tr>
<tr>
<td>History (HY 101-102 or 391-392)</td>
<td>6</td>
</tr>
</tbody>
</table>
Art for the Elementary Teacher (ARS 215) ........................................... 3
Music for the Young Child (MU 215) .................................................. 3
Physical Education for the Elementary Teacher (ED 215) ...................... 3
Modern foreign language (one language) ........................................... 6-12
Economics ......................................................................................... 3
Economics, history, political science or sociology (a minimum of 3 hours in a
discipline other than history and economics) ................................... 9
Psychology (PY 103) .......................................................................... 3

Science-Mathematics
For a B.A. degree a student should select one of the following options:
1. Biology or a physical science, 8 hrs. and 4 hrs. second area ............. 12
   Mathematics .................................................................................. 3
2. Natural Sciences (NS 111, 112, 113) .............................................. 12
   Mathematics .................................................................................. 3

For a B.S. degree:
Biology 8 hrs. and 8 hrs. in chemistry or physics .............................. 16
Mathematics ...................................................................................... 9

Area of Concentration (AOC)
Major Area of Study: Elementary Education
ED 230 Human Development ............................................................ 3
ED 261 Foundations of Education in the United States ........................ 3
ED 263 Educational Psychology ...................................................... 3
ED 300 Group Processes .................................................................. 3
ED 360 Diagnostic and Prescriptive Teaching .................................. 3
ED 372 Teaching the Social Studies ................................................ 3
ED 373 Teaching the Natural Sciences ............................................. 3
ED 374 Teaching of Arithmetic ....................................................... 3
ED 375 Teaching of Reading ............................................................ 3
ED 371 Language Arts ...................................................................... 3
ED 400 Literature for Children and Adolescents .............................. 3
ED 491 Student Teaching in the Elementary School ........................ 9

Second Area of Study ...................................................................... 18
(The minimum of 18 hours must include 15 hours numbered 300 or above.)

A student planning to teach in an elementary field must select an area from
any academic department that offers a major approved for certification by the
State Department of Education. Approved majors in the School of
Humanities and Behavioral Sciences are art, English, history, French, Ger-
man, music, political science, psychology, and sociology. Approved majors in
the School of Science and Engineering are biology, chemistry, mathematics,
and physics. Economics is an approved major in the School of Administrative
science.

Free Electives .................................................................................. 2-8
The number of elective hours possible is dependent upon the student’s high school curriculum and choice of subjects within the GER.

*Requirements for Bachelor of Science degree will exceed 128 hours. A student may substitute appropriate courses taken at another institution with permission of the Department of Education if equivalency is established.

**Professional Secondary Education Curriculum**

The curriculum in secondary education is planned to provide a broad liberal education base with a major in a professional teaching field as well as a major in professional education to prepare the teacher for the emergent master teacher and team-teaching roles in the junior and senior high schools. Upon successful completion of the program the student is eligible for the Alabama Class B Secondary Professional Teachers Certificate. See Accreditation of Program section.

**General Education Requirements**

<table>
<thead>
<tr>
<th>Humanities and Behavioral Sciences</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>English composition (EH 101-102 or 103-104)</td>
<td>6</td>
</tr>
<tr>
<td>Literature</td>
<td>6</td>
</tr>
<tr>
<td>Speech (CM 110, 113 or 214)</td>
<td>3</td>
</tr>
<tr>
<td>History (HY 101-102 or 391-392)</td>
<td>6</td>
</tr>
<tr>
<td>Modern foreign language (one language)</td>
<td>6-12</td>
</tr>
<tr>
<td>Economics, political science, or sociology (minimum 3 hrs. in economics)</td>
<td>6</td>
</tr>
<tr>
<td>Psychology (PY 103)</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Science-Mathematics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>For a B.A. degree, student should select one of the following options:</td>
<td></td>
</tr>
<tr>
<td>1. Biology or a physical science 8 hrs. and 4 hrs. in second area</td>
<td>12</td>
</tr>
<tr>
<td>Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>2. Natural Science (NS 111, 112, 113)</td>
<td>12</td>
</tr>
<tr>
<td>Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>For a B.S. degree:</td>
<td></td>
</tr>
<tr>
<td>Biology, 8 hrs. and 8 hrs. in chemistry or physics</td>
<td>16</td>
</tr>
<tr>
<td>Mathematics</td>
<td>9</td>
</tr>
</tbody>
</table>

| 57-67 |

**Area of Concentration (AOC)**

**Major Area I: Professional Teaching Field**

The student planning to teach in secondary school may select a major area from any academic department that offers a major approved for certification by the State Department of Education. Approved majors in the School of Humanities and Behavioral Sciences are art, English, history, French, German, music, political science, psychology, and sociology. Approved majors in the School of Science and Engineering are biology, chemistry, mathematics, mathematics education, and physics. Economics is an approved major in the School of Administrative Science. Find specific requirements for each major.
in appropriate section of catalog. The course requirements in most professional teaching fields do not exceed 36 hours.

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Major Area II: Professional Education Program</strong></td>
</tr>
<tr>
<td><strong>ED 261</strong> Foundations of Education in the United States</td>
</tr>
<tr>
<td><strong>ED 263</strong> Educational Psychology</td>
</tr>
<tr>
<td><strong>ED 388</strong> Teaching Secondary School Subjects</td>
</tr>
<tr>
<td><strong>ED 408</strong> Teaching Reading in the Secondary School</td>
</tr>
<tr>
<td><strong>ED 490</strong> Principles of High School Teaching (seminar)</td>
</tr>
<tr>
<td><strong>ED 497</strong> Secondary Student Teaching</td>
</tr>
<tr>
<td><strong>Advised Electives (choose any two)</strong></td>
</tr>
<tr>
<td><strong>ED 325</strong> Sociology of Education</td>
</tr>
<tr>
<td><strong>ED 360</strong> Diagnostic and Prescriptive Teaching</td>
</tr>
<tr>
<td><strong>ED 375</strong> Teaching of Reading</td>
</tr>
<tr>
<td><strong>ED 410</strong> Foundations of Educational Evaluation</td>
</tr>
<tr>
<td><strong>ED 500</strong> Special Problems in Education</td>
</tr>
<tr>
<td><strong>ED 549</strong> Educational Media</td>
</tr>
<tr>
<td><strong>Electives</strong></td>
</tr>
<tr>
<td><strong>128</strong>*</td>
</tr>
</tbody>
</table>

Students seeking certification in secondary education will have an opportunity for electives by judicious planning of their general courses. For example, courses taken in the GER may also be counted as part of their major in Area I.

Students may substitute appropriate courses taken at another institution with permission of the Education Department if equivalency is established.

*Requirements for Bachelor of Science degree will exceed 128 hours.

**Education (ED)**

<table>
<thead>
<tr>
<th>111</th>
<th>Career Exploration</th>
<th>1 hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educational and vocational planning. Prerequisite: 9 hours college credit and placement tests.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>115</th>
<th>Effective Reading and Study Skills Techniques</th>
<th>3 hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic reading-skill development in class activities to raise skills on literal, interpretative, critical, and creative levels of comprehension.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>261</th>
<th>Foundations of Education in the United States</th>
<th>3 hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of education in America and its relation to prospective teachers. Prerequisite: sophomore standing.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>263</th>
<th>Educational Psychology</th>
<th>3 hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological principles basic to an understanding of the learner, the learning process, and the learning situation. Prerequisite: PY 103 and sophomore standing.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>325</th>
<th>The Sociology of Education</th>
<th>3 hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>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).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course</td>
<td>Title</td>
<td>Hours</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>410</td>
<td>Foundations of Educational Evaluation</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Measurement process with emphasis on its relation 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.</td>
<td></td>
</tr>
<tr>
<td>411</td>
<td>Guidance for Teachers</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Sociological, psychological, and philosophical bases for guidance in schools.</td>
<td></td>
</tr>
<tr>
<td>456</td>
<td>Mental Health in the School</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Dynamics of behavior, recognition of minor maladjustments, criteria for referral, and classroom practices supporting good mental health. Prerequisite: ED 263 or equivalent and junior standing.</td>
<td></td>
</tr>
<tr>
<td>467</td>
<td>Tests and Measurements</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Survey of standardized and teacher-made evaluation instruments.</td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>Special Problems in Education</td>
<td>1-3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Independent study, special projects, and special in-service programs. Prerequisite: senior standing.</td>
<td></td>
</tr>
<tr>
<td>502</td>
<td>Environmental Education</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>549</td>
<td>Audiovisual Instruction</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Audiovisual media in teaching and the selection, use, and maintenance of audiovisual materials in educational programs.</td>
<td></td>
</tr>
</tbody>
</table>

**Elementary Education**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>215</td>
<td>Physical Education for the Elementary Teacher</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Basic understanding of body alignment, developmental exercises and movement exploration activities for physical education in the elementary grades. Study of student needs to provide proper equipment, facilities, and leadership for the overall program.</td>
<td></td>
</tr>
<tr>
<td>230</td>
<td>Human Development</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Overview of human development stressing continuity from conception to adulthood. Practical applications for teachers and parents.</td>
<td></td>
</tr>
<tr>
<td>231</td>
<td>Teaching the Young Child</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Total pattern of child development, curriculum, learning, methods, and guidance for the child from two to nine years of age.</td>
<td></td>
</tr>
<tr>
<td>300</td>
<td>Group Processes</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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. (Enrollment for less than 3 hours credit only with permission of instructor.)</td>
<td></td>
</tr>
<tr>
<td>360</td>
<td>Diagnostic and Prescriptive Teaching</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Strengths and deficiencies of student in academic area and a program to enhance strengths and remedy weakness. Group and individual processes. Prerequisite: ED 263, junior standing and admission to Teacher Education Program.</td>
<td></td>
</tr>
</tbody>
</table>

Note: ED 371 thru 375 include minimum of 16 hours laboratory experience in local elementary schools.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>371</td>
<td>Language Arts</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Current practices in language arts instruction, materials, and characteristics of students. Development of all language art skills to appropriate level. Prerequisite: ED 360.</td>
<td></td>
</tr>
</tbody>
</table>
Teaching the Social Studies 3 hrs.
Curriculum, instructional approaches, 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. Prerequisite: none.

Student Teaching in the Elementary School 9 hrs.
Supervised teaching experience in local elementary schools. Concurrent conferences arranged as needed. Prerequisite: ED 230, 261, 263, 300, 360, two methods courses, or equivalent approved courses, and an approved application for student teaching.

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, two methods courses, or equivalent approved courses, and an approved application for student teaching.

Teaching Secondary School Subjects 3 hrs.
(Major area of teaching to be designated.) Materials and methods in the major fields. Prerequisite: ED 263 and admission to Teacher Education Program.

Teaching Reading in the Secondary School 3 hrs.
Basic developmental and remedial reading skills, practices, and concepts. Extension of those learned in previous reading courses and methods of applying those fundamental skills and knowledge to regular high school classrooms. Adaptation of fundamentals of reading instruction to various subject-matter areas (i.e., the sciences, social studies, English, et cetera) Special reading programs such as remedial reading and reading instruction as practiced in Special Education. Prerequisite: junior standing.

Principles of High School Teaching 3 hrs.
Course to be taken concurrently with student teaching. Prerequisite: ED 388 and senior standing.

Secondary Student Teaching 9 hrs.
Observation and student teaching in secondary schools. Prerequisite: ED 263, 388, and approved application for student teaching.

Observations and Participation in Teaching 3-6 hrs.
Selected observation and participation in secondary schools. For students in secondary and elementary curricula and for experienced teachers. Prerequisite: ED 263, 388, and approved application for student teaching.
Special Education

495  Psychology and Education of the Mentally Retarded I  3 hrs.
Social, emotional, physical, and learning characteristics of retarded children and youth.
Prerequisite: ED 263.

496  Psychology and Education of the Mentally Retarded II  3 hrs.
Continuation of ED 495 with emphasis upon educational organization and teaching techniques.
Prerequisite: ED 263.

593  Education of Exceptional Children and Youth  3 hrs.
Introduction to the field of exceptional children and youth. Prerequisite: ED 263.
(Same as DL 593).

Graduate Study in Education

A Master of Arts degree in developmental learning is described on pp. 133. Options available under this degree include learning disabilities. This option leads toward Alabama Class A certification in special education.

Master's degree programs in the School of Administrative Science and the School of Humanities and Behavioral Sciences for Alabama Class A secondary certification are found in the Departments of English and History and in programs in developmental learning and administrative science. Programs in the School of Science and Engineering leading toward Alabama Class A secondary certification are found in the Departments of Biology, Chemistry, Mathematics, and Physics. The graduate program in biology is a joint UAH and Alabama A&M degree offering. Consult with the advisers in the Biology Department regarding special requirements. 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.

To be admitted to graduate study in education, a student must meet the GER for admission to 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. 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. (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.

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.
English Department

Professors Francis, Martin (chairman), Welker; Professors Emeriti, Hutchens, Woodard; Associate Professors Harrison, Munson; Assistant Professors Conover, Dillard, Moore, Williams; Instructor Allen; Adjunct Instructor Daugherty.

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>Course Description</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shakespeare (EH 360)</td>
<td>3</td>
</tr>
<tr>
<td>American literature (EH 330, 331, 430, 431, 432/532, 433/533)</td>
<td>3</td>
</tr>
<tr>
<td>Literature before 1800</td>
<td>6</td>
</tr>
<tr>
<td>Literature after 1800</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>6-15</td>
</tr>
</tbody>
</table>

24-33

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 include a minimum of 21 semester hours, of which 9 hours must be in courses numbered 300 or above.

Near the end of the sophomore year, the English major should choose 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 numberd 400 or above, identified as follows:

<table>
<thead>
<tr>
<th>Course Description</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>
</tbody>
</table>

21
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. The curriculum may require more than the minimum total of 128 hours for the degree. A typical program is:

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>American literature (EH 330, 331, 430, 431, 432) ......................... 3</td>
</tr>
<tr>
<td>Shakespeare (EH 360) .................................................... 3</td>
</tr>
<tr>
<td>Literature before 1800 .................................................... 3</td>
</tr>
<tr>
<td>Literature after 1800 ..................................................... 3</td>
</tr>
<tr>
<td>English Linguistics or History of the English Language (507 or 508) ........ 3</td>
</tr>
<tr>
<td>Elective ................................................................. 3</td>
</tr>
</tbody>
</table>

**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 hours for a student attending full-time for three or more terms; otherwise, 33 hours. A maximum of 9 hours a 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 a 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.

English (EH)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>003</td>
<td>Remedial Writing</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>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 Code</th>
<th>Course 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. Prerequisite: EH 205.</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 grammar and introduction to transformationalism.</td>
<td></td>
</tr>
</tbody>
</table>
210 Fiction Writing
Practice in writing of fiction from conception to revision. Prerequisite: EH 206 and approval of instructor. 3 hrs.

230 Survey of American Literature
Survey of writers, genres, and periods from the Puritans to the present day. 3 hrs.

240 World Literature
Selected major contributions to Western civilization; Homer to the Renaissance. 3 hrs.

241 World Literature
Selected major contributions to Western civilization; Rabelais to the present. 3 hrs.

242 Mythology
Archetypal, metaphorical, and historical significance of deities and myths. 3 hrs.

250 Business and Professional Writing
Practical writing, especially correspondence and reports, with emphasis on design, organization, research, and presentation. 3 hrs.

Courses below are open to students who have completed the general education requirement in literature, with exceptions as indicated.

330 Major American Writers
Major writers from the Colonial period to Whitman and Melville. 3 hrs.

331 Major American Writers
Dickinson to Eliot and Faulkner. 3 hrs.

339 Special Studies in American Literature and Culture
Topics announced in advance. Applicable to American studies minor. 3 hrs.

340 Special Topics in Literature
Theme, writer, or historical movement to be announced in advance. 3 hrs.

345 Special Topics in Film, Literature, and Film Theory
Offered periodically on varying topics. 3 hrs.

360 Shakespeare
Renaissance background and at least six plays, including history, comedy, and major tragedies. 3 hrs.

380 Restoration and Early Eighteenth Century
Dryden, Swift, Pope, and others. 3 hrs.

381 Later Eighteenth Century
Johnson, Boswell, and others. 3 hrs.

390 The Romantic Period
Poetry and nonfictional prose, 1780-1832. 3 hrs.

391 The Victorian Period
Poetry and nonfictional prose, 1832-1901. 3 hrs.

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. 3 hrs.

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.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>411</td>
<td>Library Research</td>
<td>3 hrs.</td>
<td>Introduction to enumerative, descriptive, analytical, and textual bibliography as well as research methods, tools, and terminology used in literary research. Prerequisite: junior standing.</td>
</tr>
<tr>
<td>420</td>
<td>Modern Poetry</td>
<td>3 hrs.</td>
<td>Major movements in American and British poetry of the twentieth century. Prerequisite: junior standing.</td>
</tr>
<tr>
<td>421</td>
<td>Modern Drama</td>
<td>3 hrs.</td>
<td>New movements in drama from Ibsen to the present.</td>
</tr>
<tr>
<td>430</td>
<td>The American Novel</td>
<td>3 hrs.</td>
<td>Theme and form of the American novel from Cooper to James.</td>
</tr>
<tr>
<td>431</td>
<td>The American Novel</td>
<td>3 hrs.</td>
<td>Representative works from the school of naturalism to the present.</td>
</tr>
<tr>
<td>432</td>
<td>The Southern Renaissance</td>
<td>3 hrs.</td>
<td>Origin and development of Southern myth with emphasis on major writers of the Southern Renaissance. Prerequisite: junior standing.</td>
</tr>
<tr>
<td>433</td>
<td>William Faulkner</td>
<td>3 hrs.</td>
<td>Critical study of the works of Faulkner, concentrating on his major phase, 1929-42; biography and background.</td>
</tr>
<tr>
<td>450</td>
<td>Chaucer</td>
<td>3 hrs.</td>
<td>The Canterbury Tales and other major works studied in relation to English and European literary and philosophical traditions. Prerequisite: junior standing.</td>
</tr>
<tr>
<td>451</td>
<td>Middle English Literature</td>
<td>3 hrs.</td>
<td>The literature of later medieval England, excluding Chaucer, chosen from the Gawain poet, Malory, other romance and dream vision, the drama, and the short poem.</td>
</tr>
<tr>
<td>460</td>
<td>Sixteenth-Century Poetry and Prose</td>
<td>3 hrs.</td>
<td>Wyatt, Sidney, Spenser, and others.</td>
</tr>
<tr>
<td>461</td>
<td>Shakespearean Studies</td>
<td>3 hrs.</td>
<td>Concentration on one or more themes or genre in the Shakespeare canon, with special attention to the less well-known plays and to the plays as visual productions. Prerequisite: EH 360 recommended.</td>
</tr>
<tr>
<td>470</td>
<td>Milton and the Seventeenth Century</td>
<td>3 hrs.</td>
<td>Milton's minor poems, selected prose, and Paradise Lost studied with reference to the seventeenth-century context.</td>
</tr>
<tr>
<td>471</td>
<td>Sixteenth-Century Drama</td>
<td>3 hrs.</td>
<td>The Elizabethan theatrical tradition from 1500 with emphasis on the plays of Marlowe. Excludes Shakespeare.</td>
</tr>
<tr>
<td>473</td>
<td>Seventeenth-Century Drama</td>
<td>3 hrs.</td>
<td>Tragicomedy, baroque tragedy and the heroic play, satiric comedy, Jonson through the Restoration.</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>492</td>
<td>The English Novel</td>
<td>3 hrs.</td>
<td>Defoe to Jane Austen: critical reading of representative novels accompanied by historical study of the emergence of the genre.</td>
</tr>
<tr>
<td>493</td>
<td>The English Novel</td>
<td>3 hrs.</td>
<td>Dickens through Hardy: critical reading of representative novels accompanied by historical survey of major trends.</td>
</tr>
<tr>
<td>494</td>
<td>Studies in the Twentieth-Century Novel</td>
<td>3 hrs.</td>
<td>Major novelists as they attempt to depict reality in response to the post-Darwinian world. Prerequisite: junior standing.</td>
</tr>
<tr>
<td>500</td>
<td>Literary Criticism</td>
<td>3 hrs.</td>
<td>Major theories and methods with application by student. Prerequisite: senior standing.</td>
</tr>
<tr>
<td>530</td>
<td>Special Studies in American Literature</td>
<td>3 hrs.</td>
<td>Intensive study of one or more writers, groups, or movements; announced in advance. Prerequisite: junior standing.</td>
</tr>
<tr>
<td>540</td>
<td>Special Studies in English Literature</td>
<td>3 hrs.</td>
<td>Intensive study of one or more writers, groups, movements; announced in advance. Prerequisite: junior standing.</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>Literary Criticism</td>
<td>3 hrs.</td>
<td>Major theories and methods with application by student. Prerequisite: senior standing.</td>
</tr>
<tr>
<td>507</td>
<td>English Linguistics</td>
<td>3 hrs.</td>
<td></td>
</tr>
<tr>
<td>508</td>
<td>History of the English Language</td>
<td>3 hrs.</td>
<td></td>
</tr>
<tr>
<td>511</td>
<td>Library Research</td>
<td>3 hrs.</td>
<td></td>
</tr>
<tr>
<td>520</td>
<td>Modern Poetry</td>
<td>3 hrs.</td>
<td>Major movements in British and American poetry of the twentieth century. Selected readings in important criticism.</td>
</tr>
<tr>
<td>530</td>
<td>Special Studies in American Literature</td>
<td>3 hrs.</td>
<td></td>
</tr>
<tr>
<td>532</td>
<td>Southern Renaissance</td>
<td>3 hrs.</td>
<td></td>
</tr>
<tr>
<td>533</td>
<td>William Faulkner</td>
<td>3 hrs.</td>
<td></td>
</tr>
<tr>
<td>540</td>
<td>Special Studies in English Literature</td>
<td>3 hrs.</td>
<td></td>
</tr>
<tr>
<td>550</td>
<td>Chaucer</td>
<td>3 hrs.</td>
<td></td>
</tr>
<tr>
<td>571</td>
<td>Sixteenth-Century Drama</td>
<td>3 hrs.</td>
<td></td>
</tr>
<tr>
<td>572</td>
<td>Seventeenth-Century Poetry</td>
<td>3 hrs.</td>
<td></td>
</tr>
<tr>
<td>573</td>
<td>Seventeenth-Century Drama</td>
<td>3 hrs.</td>
<td></td>
</tr>
<tr>
<td>601</td>
<td>The Idea of the Tragic</td>
<td>3 hrs.</td>
<td>Study of elements of the tragic in the theater and in the modern novel.</td>
</tr>
</tbody>
</table>
630 Studies in American Literature to 1865 3 hrs.
Major movements from Colonial times to 1865; selected major figures or special problems.

631 Studies in American Literature since 1865 3 hrs.
Major movements since 1865; selected major figures or special problems.

639 Special Studies in American Literature 3 hrs.
Study of one or more writers, genres, groups, or movements; announced in advance.

649 Special Studies in English Literature 3 hrs.
Study of one or more writers, genres, groups, or movements; announced in advance.

651 Studies in the Age of Chaucer 3 hrs.
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.

660 Seminar in Shakespeare 3 hrs.
Emphasis on the “problem” plays and less celebrated tragedies and histories, with special attention to the major criticism, problems of interpretation, and the Elizabethan background.

665 The Renaissance 3 hrs.
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.

670 Milton 3 hrs.
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 *Paradise Lost*.

680 Eighteenth-Century Studies 3 hrs.
Literary life of the century. Participation by faculty members of other departments.

690 Studies in English Romanticism 3 hrs.
Seminar. Selected poetry and critical prose with attention to aesthetic theory and philosophical and psychological backgrounds.

691 Studies in the Victorian Period 3 hrs.
Seminar. Representative writing, both poetry and prose with emphasis on social and cultural changes that inform the literature.

699 Master’s Thesis 3 hrs.
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.
Health, Physical Education and Recreation Program
Assistant Professor Manjone (director)

Health and Physical Education Activity Offerings
Fitness, active participation, and good health habits are essential in modern society. Through a variety of health and physical education activity courses, 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.

Health and Physical Education Professional Offerings.
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 Professional 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. The HPER offerings meet this demand with professional courses.

A composite major in Recreation provides options in outdoor recreation management, therapeutic recreation, recreation administration, or recreation programming. This composite major combines HPER course offerings with those in related disciplines (business, biology, computer science, sociology, psychology, political science, music, and art) to provide the required education of today’s recreation professional. Information on requirements for this composite major in recreation can be obtained from the HPER director or the Academic Advisement and Information Center.

Health and Physical Education (HPE)
Activity Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Physical Fitness</td>
<td>1 hr.</td>
</tr>
<tr>
<td>101</td>
<td>Slimnastics</td>
<td>1 hr.</td>
</tr>
<tr>
<td>102</td>
<td>Aerobic Dance</td>
<td>1 hr.</td>
</tr>
<tr>
<td>103</td>
<td>Jogging for Fitness and Weight Control</td>
<td>1 hr.</td>
</tr>
<tr>
<td>104</td>
<td>Beginning Weight Training</td>
<td>1 hr.</td>
</tr>
<tr>
<td>105</td>
<td>Beginning Self-Defense</td>
<td>1 hr.</td>
</tr>
<tr>
<td>106</td>
<td>Folk and Square Dance</td>
<td>1 hr.</td>
</tr>
</tbody>
</table>
107  Beginning Stunts and Tumbling  1 hr.
110  Beginning Swimming  1 hr.
111  Swimnastics; Lab fee: Level 3  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  1 hr.
125  Basic Horseback Riding; Lab fee: Level 13 (all-weather indoor arena available.)  1 hr.
126  Beginning Golf; Lab fee: Level 4  1 hr.
127  Beginning Bowling; Lab fee: Level 4  1 hr.
128  Basic Bridge  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.
140  Intermediate Ice-Skating; Lab fee: Level 4  1 hr.
141  Intermediate Swimming  1 hr.
142  Intermediate Self-Defense  1 hr.
143  Intermediate Tennis; Lab fee: Level 1  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 4  1 hr.
148  Intermediate Frisbee  1 hr.
149 Intermediate Aerobic Dance 1 hr.
150 Advanced Lifesaving 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 4 1 hr.
158 Advanced Ice-Skating; Lab fee: Level 4 1 hr.
159 Power Weight Lifting 1 hr.
160 Water-Safety Instruction 1 hr.
161 Horseback Riding II - Field Riding; Lab fee: Level 13 1 hr.
162 Varsity Sports - Basketball 1 hr.
163 Varsity Sports - Soccer 1 hr.
164 Varsity Sports - Crew 1 hr.
165 Varsity Sports - Tennis 1 hr.

Professional Courses

180 History and Principles of Physical Education 3 hrs.

190 CPR Instructor 1 hr.
Twenty-five hours of comprehensive techniques in the basics and instruction of cardiopulmonary resuscitation. Upon successful completion of the course, student is certified as a CPR Instructor.

191 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).

192 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).

193 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 Instruction I 3 hrs.
Preparation for initial solo flight. Twenty hours of ground instruction and 12 hours of dual flight. Prerequisite: successful completion of F.A.A. Class III Medical Exam. Lab fee: Level 9.

Private Pilot Instruction II 3 hrs.
Preparation for initial solo cross-country flight, and F.A.A. Private pilot written exam. Twelve hours of ground instruction, 5 hours of test and critique, and 20 hours of flight -12 duals, 8 solo. Prerequisite: 270. Lab fee: Level 10.

Private Pilot Instruction III 3 hrs.
Minimum hour requirement for F.A.A. Private pilot solo-and dual-flight requirement. Twelve hours of dual-flight and 8 hours of solo-flight instruction. Prerequisite: 271. Lab fee: Level 11.

Recreation (REC)

Introduction to Leisure Services 3 hrs.
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.

Leisure Services Leadership and Supervision 3 hrs.
Processes and techniques of leadership and supervision related to leisure services. Delineation and differences between group action and individualized decision-making. Supervisory experience, 40 hours of leadership.

Introduction to Therapeutic Recreation 3 hrs.
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.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<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>
</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>
</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>
</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>
</tr>
<tr>
<td>321</td>
<td>Military Recreation</td>
<td>3 hrs.</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>
</tr>
<tr>
<td>331</td>
<td>European Recreation Study Tour</td>
<td>6 hrs.</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>
</tr>
<tr>
<td>341</td>
<td>Campus Recreation</td>
<td>3 hrs.</td>
<td>Campus recreation-programming and administration. Tournament organization and scheduling. Forty hours of work experience in campus recreation programs.</td>
</tr>
<tr>
<td>490</td>
<td>Internship in Leisure Services</td>
<td>10 hrs.</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, MGT 301, senior standing or approval of instructor.</td>
</tr>
</tbody>
</table>
History Department

Professor J. White (chairman); Professor Emerita Roberts; Adjunct Professor H. Parker; Associate Professors Boucher, Hull, L. Parker, Shields, C. White; Assistant Professor Williams

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 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 including 6 semester hours in courses numbered 300 or above. The minor program must have the approval of the History 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.
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 advisor and the approval of the chairman of the Department of History. 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 is 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 are 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 in cooperation with the Department of Modern Foreign Languages.

Each applicant must: (a) have a minimum overall undergraduate QPA of at least 2.0 (A = 3.0) or at least 2.0 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)**

101 Origins and Development of the Contemporary World, Part I 3 hrs.
Major Western civilizations to 1500. Not open to seniors

101 Origins and Development of the Contemporary World, Part I T (Tutorial) 3 hrs.
Similar to HY 101. Development of the basic skills of historical study. Permission of history faculty required.

102 Origins and Development of the Contemporary World, Part II 3 hrs.
Major Western civilizations since 1500. Not open to seniors.

102 Origins and Development of the Contemporary World, Part II T (Tutorial) 3 hrs.
Similar to HY 102. Development of the basic skills of historical study. Permission of faculty required.

Courses below are open to all students other than beginning freshmen, with exceptions as indicated.

201 Current American Issues in Historical Perspective 1-3 hrs.
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).

202 Current World Issues in Historical Perspective 1-3 hrs.
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).

221 The United States to 1877 3 hrs.
The discovery of America through the Civil War and Reconstruction.

222 The United States Since 1877 3 hrs.
The United States from the end of the Civil War era to the present.

225 History of Alabama 3 hrs.
The state's past from colonial times to the present with emphasis on its place in United States history.

229 Survey of Ancient Times 3 hrs.
The ancient Near East, Greece, and Rome. Prerequisite: HY 101-102 or approval of instructor.

247 English Constitutional History to 1603 3 hrs.
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. (Same as PSC 247).

248 English Constitutional History since 1603 3 hrs.
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. Same as (PSC 248).

249 Current World History 3 hrs.
A broadly based study of the post World War II period involving all continents.

Courses listed below are open to students who have completed 12 semester hours in history or have junior standing.

337 Contemporary Latin America 3 hrs.
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.

341 Modern France 3 hrs.
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. Prerequisite: HY 101-102.

343 Modern Germany 3 hrs.
Modern German history from the Congress of Vienna in 1815 through the Second World War and Germany's role in current history. Political, economic, and cultural factors in the development of the German nation. Prerequisite: HY 101 and 102.

364 The Westward Movement in American History since 1803 3 hrs.
Pioneering society, Indian relations, land policies, expansion, and politics of the westward-moving frontier.

366 The Negro in Twentieth Century America 3 hrs.
The interrelationship of the Negro and the industrial-urban environment of the United States.

369 Social and Cultural History of the United States to 1865 3 hrs.
Major themes in the development of American culture and society from the colonial period to the Civil War era.

370 Social and Cultural History of the United States since 1865 3 hrs.
Major themes in the modernization of American culture and society since the Civil War.

373 Foreign Relations of the United States to 1900 3 hrs.
American foreign relations from the Revolutionary era to the emergence of the United States as a world power. American territorial and commercial expansion and relations with the European powers.

374 Foreign Relations of the United States since 1900 3 hrs.
The United States as a world power. American involvement in both world wars, the development of the Cold War, and the growth of American presence in Asia and Latin America.

375 Imperial Russia 3 hrs.
The formation and development of the Russian Empire from the reign of Peter the Great until the Revolution of 1905. The multinational character of the Empire and its manifestation in political, economic, and cultural aspects of Russian life.
Twentieth-Century Russia 3 hrs.
The last years of Imperial rule, the constitutional experiment. World War I and the resulting revolutions of 1917, the rise and development of the Soviet Union from its inception until the present.

Europe, 1500-1815 3 hrs.
An examination of the economic, commercial, scientific, social, political, and cultural developments in Europe from the Renaissance to the close of the Napoleonic Wars. Not open to history majors who have taken HY 101-102.

Europe Since 1815 3 hrs.
A study of Europe from the end of the Napoleonic Wars to the present with equal emphasis on the nineteenth and twentieth centuries. Prerequisite: HY 391 or approval of instructor. Not open to history majors who have taken HY 101-102.

Courses listed below are open to students who have completed 15 semester hours in history or 12 semester hours in history with senior standing.

Problems in Modern History 3 hrs.
Special themes in history such as war in the modern world, ideas in history, the African-American experience, technology, and culture.

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.

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.

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.

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.

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.

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.

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.

Renaissance and Reformation 3 hrs.
Europe during the Renaissance and Reformation. Political, social, economic, and cultural developments.
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>475</td>
<td>The Age of Absolutism</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>477</td>
<td>The Age of Revolution</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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 Revolution of 1848.</td>
<td></td>
</tr>
<tr>
<td>485</td>
<td>Modern Europe</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Major events in European history from the unification of Italy and Germany through the world wars to the present.</td>
<td></td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>518</td>
<td>Constitutional History of the United States</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>524</td>
<td>The Atlantic World</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>537</td>
<td>Emergence of Modern America</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>573</td>
<td>The High Middle Ages. C. 1000-1500</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>574</td>
<td>Renaissance and Reformation</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>577</td>
<td>The Age of Revolution</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>590</td>
<td>Senior Seminar in History</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Historiography, research and writing, and recent interpretations in the field of history. Open only to seniors who are majoring or minoring in history or to graduate students.</td>
<td></td>
</tr>
</tbody>
</table>

Courses at the 600 level are open only to graduate students or to senior history majors with permission of the instructor.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>605</td>
<td>Recent Interpretations of Modern History</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>611</td>
<td>Problems in Modern History</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>614</td>
<td>Studies in Southern History</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>628</td>
<td>Studies in Nineteenth Century American History</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>638</td>
<td>Studies in Twentieth Century American History</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>675</td>
<td>Studies in Early Modern European History</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>685</td>
<td>Studies in Modern European History</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Major events in European history from the unification of Italy and Germany through the world wars to the present.</td>
<td></td>
</tr>
<tr>
<td>698</td>
<td>Directed Readings in History</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
</tbody>
</table>
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.
Modern Foreign Languages Department
Professors Penot, Wilson; Associate Professor O’Neal; Associate Professor Emerita Heller; Assistant Professors Leister, 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 Modern Foreign Languages 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, advanced grammar and composition, and the introduction to literature courses are required. An additional course on the 300 level complete the requirement for the minor.
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.

Foreign Languages International Trade

The MFL Department, in conjunction with the Department of Business Administration and Economics, 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:

Business courses:

AC 211,
AC 212 Principles of Accounting
BUS 321 Business Law 1
FIN 301 Principles of Finance
MGT 301 Principles of Management
MKT 301 Principles of Marketing
AC 450 Studies in International Accounting
FIN 554 International Finance
MGT 520 International Management
MKT 515 International Marketing

Modern Foreign Language courses

FL*101, 102 or
103, 104 Elementary FL (French, German, Russian, or Spanish)
FL 201, 202 or
203 Intermediate FL (French, German, Russian, or Spanish)
FL 3-- Advanced Conversation
FL 3-- Advanced Composition
FL 3-- - - Culture
FL 3-- Introduction to Literature
FL 3-- Business and Professions
FL 4-- Practicum
FL 4-- Elective
FL 4-- Elective

*Foreign Language

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, modern foreign languages, 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, 591, and three selections
approved by the History Department chairman

Political Science ........................ 101, 205, 305, or 315
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 Modern Foreign Languages Department, who also chairs the Slavic Area Studies Committee, composed of representatives from the participating disciplines.

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 Modern Foreign Languages 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 Modern Foreign Languages 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 Modern Foreign Languages. 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 Modern Foreign Languages. This curriculum may require more than the minimum total of 128 hours for the degree.

Modern Languages (ML)

319 German Masterpieces in English Translation 3 hrs.
German literature in English translation from its beginning to the present, with emphasis on mature works of such writers as Goethe, Schiller, Hoffman, Kleist and Kafka.

333 Russian Masterpieces in English Translation 3 hrs.
Prerequisite: EH 206 or approval of instructor.

French (FH)

101 Elementary French 3 hrs.

102 Elementary French 3 hrs.
Prerequisite: FH 101 or placement.

103 Introductory French I 4 hrs.
Total immersion in French, using the Dartmouth Intensive Language Model. Language and cultural elements. Individualized instruction.

104 Introductory French II 4 hrs.
Continuation of French 103. Prerequisite: FH 103 or approval of instructor.

201 Intermediate French 3 hrs.
Prerequisite: FH 102 or placement.

202 Intermediate French 3 hrs.
Prerequisite: FH 201 or placement.

203 Introductory French III 4 hrs.
Continuation of Level II with increased emphasis on culture. Prerequisite: FH 104 or approval of instructor.

300 Introduction to French Literature 3 hrs.
Major movements and works from the beginning to the present. Prerequisite: FH 202 or approval of instructor.

303 French Conversation 3 hrs.
Oral drills, pronunciation exercises, and simple oral reports. Prerequisite: FH 202.

304 Advanced French Composition 3 hrs.
Composition with emphasis on grammar review and idiomatic expression. Prerequisite: FH 202, 203, or approval of instructor.

307 French Culture 3 hrs.
Contrastive cultural patterns of French-speaking peoples: their cause and effect. Prerequisite: FH 202 or approval of instructor.

310 French for Business and Professions 3 hrs.
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.

403 Sixteenth Century French Literature 3 hrs.
Intellectual, philosophical, and aesthetic trends and developments in Renaissance France, using representative works of the period. Prerequisite: FH 300 or approval of instructor.

404 Seventeenth Century French Literature 3 hrs.
Masterpieces of the period with emphasis on the theater of Corneille, Racine, and Moliere. Prerequisite: FH 300 or approval of instructor.

405 Eighteenth Century French Literature 3 hrs.
French thought and writing in this important century. Representative works from Voltaire to Chenier. Prerequisite: FH 300 or approval of instructor.

406 Nineteenth Century French Novel 3 hrs.
Principal novelists of the nineteenth century: Balzac, Stendahl, Flaubert, Zola. Prerequisite: FH 300 or approval of instructor.

407 French Drama 3 hrs.
The most influential French dramatists from the nineteenth century to the present. Prerequisite: FH 300 or approval of instructor.

408 Twentieth Century French Novel 3 hrs.
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.

410 Practicum 3 hrs.
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.

499 Independent Studies 3 hrs.
Prerequisite: approval of department chairman.

**German (GN)**

101 Elementary German I 3 hrs.

102 Elementary German II 3 hrs.
Prerequisite: GN 101 or placement

103 Introductory German - Level I 4 hrs.
A new teaching method known as the Dartmouth Intensive Language Model which emphasizes oral comprehensive, speaking, reading, and cultural training.

104 Introductory German - Level II 4 hrs.
Continuation of German 103. Prerequisite: GN 103 or approval of instructor.

201 Intermediate German I 3 hrs.
Prerequisite: GN 102 or placement.

202 Intermediate German II 3 hrs.
Prerequisite: GN 201 or placement.

203 Introductory German - Level III 4 hrs.
Continuation of German 104. Prerequisite: GN 104 or approval of instructor.
300 Introduction to German Literature 3 hrs.
Major movements and works from the beginning to the present. Prerequisite: GN 202 or approval of instructor.

311 German Conversation 3 hrs.
Oral practice, communication and reports, emphasizing topics of daily experiences, travels, and contemporary German life. Prerequisite: GN 202 or approval of instructor.

312 Advanced German Composition and Usage 3 hrs.
Composition with emphasis on grammar review and idiomatic expression. Prerequisite: GN 202 or approval of instructor.

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.

424 History of the German Language 3 hrs.
Linguistic development of German from the first written records through Middle High German to Early New High German. Prerequisite: two 300-level German courses 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.
Independent Studies 1-3 hrs.
Prerequisite: approval of department chairman.

**Russian (RN)**

**101**  
Elementary Russian  
3 hrs.

**102**  
Elementary Russian  
Prerequisite: RN 101 or placement.  
3 hrs.

**201**  
Intermediate Russian  
Prerequisite: RN 102 or placement.  
3 hrs.

**202**  
Intermediate Russian  
Prerequisite: RN 201 or placement.  
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.
Spanish (SH)

101 Elementary Spanish 3 hrs.

102 Elementary Spanish
Prerequisite: SH 101 or placement. 3 hrs.

201 Intermediate Spanish 3 hrs.
Prerequisite: SH 102 or placement.

202 Intermediate Spanish
Prerequisite: SH 201 or placement. 3 hrs.

300 Introduction to Spanish Literature 3 hrs.
Major movements and works from the beginning to the present. Prerequisite: SH 202 or approval of instructor.

320 Hispanic Culture 3 hrs.
Contrastive Hispanic and American cultural patterns; their cause and effect. Prerequisite: SH 202 or approval of instructor.

323 Spanish Conversation and Pronunciation 3 hrs.
Prerequisite: SH 202 or approval of instructor.

324 Advanced Spanish Grammar and Composition 3 hrs.
Recommended for teachers. Prerequisite: SH 202 or approval of instructor.

327 Spanish for Business and Professions 3 hrs.
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.

420 Practicum 3 hrs.
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.

423 Cervantes: Don Quixote 3 hrs.
Diverse interpretations of this famous novel and its transcendency as a work. Prerequisite: SH 300 or approval of instructor.

424 Golden Age Drama 3 hrs.
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.

427 Spanish American Novel 3 hrs.
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.

429 The Generation of '98 3 hrs.
Literary and philosophical works representative of this important group of Spanish writers. Emphasis on Miguel de Unamuno. Prerequisite: SH 300 or approval of instructor.

499 Independent Studies 1-3 hrs.
Prerequisite: approval of department chairman.
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 semanties. 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.
Music Department

Professors Boyer (chairman), Pales; Assistant Professors Contreras, Winking, Adjunct Assistant Professor Groom; Instructor Shingler; 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 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 297 Jazz Workshop

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 placement examinations 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 placement.

B.A. Degree in Music

The Bachelor of Arts degree in music, with emphasis in either performance or music literature, is a 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.
Composite majors are currently being developed in the areas of musical theater, music recreation, and commercial music. More information and detailed programs of study are available in the Department of Music office.

**B.A. Degree in Music Education**

The Bachelor of Arts degree in music education is a 140-credit hour 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 (Class B Professional Teacher's Certificate) with strength in either vocal or instrumental music. Students must demonstrate throughout their course 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.

Because of impending changes in Alabama teachers-certification requirements, degree requirements may change from those listed.

**Bachelor of Arts in Music and Music Education**

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, philosophy should be selected for the social science requirement and either French or German for the language requirement. Students emphasizing music education should satisfy their social science requirement. They must select Option C or D to satisfy the science-mathematics requirements. They must also include speech (CM) 110, 113, or 214 for teacher certification.

II. **Area of Concentration** (select A or B) Maximum: 70 hrs.

A. **Music Performance or Literature Emphasis**

Major

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MU 1-1/4-3 Principal Instrument* (12 terms; 8 hours upper level)</td>
<td>16</td>
</tr>
<tr>
<td>MU 1-0/2-0 Secondary Instrument (6 terms)</td>
<td>4</td>
</tr>
<tr>
<td>MU 101, 102, 201, 202, 203 Theory-Harmony</td>
<td>10</td>
</tr>
<tr>
<td>MU 104, 105, 204, 205, 206 Musicianship Skills</td>
<td>5</td>
</tr>
<tr>
<td>MU 110 Introduction to Music Listening</td>
<td>3</td>
</tr>
<tr>
<td>MU 311, 312 Music History</td>
<td>6</td>
</tr>
<tr>
<td>MU 401, Twentieth-Century Materials and Techniques</td>
<td>3</td>
</tr>
<tr>
<td>MU 325 Conducting</td>
<td>2</td>
</tr>
<tr>
<td>Upper-level music elective</td>
<td>2</td>
</tr>
<tr>
<td>Ensembles**</td>
<td>3-6</td>
</tr>
<tr>
<td>Junior recital</td>
<td>0</td>
</tr>
<tr>
<td>Senior recital</td>
<td>0</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.
Minor
Selected minor from a discipline represented in GER fulfillment.

B. Music Education Emphasis (Composite Major-Minor)

Music Performance, Theory, and Literature

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MU 1-0/4-0 Principal Instrument</td>
<td>8</td>
</tr>
<tr>
<td>Junior recital (solo and ensemble works)</td>
<td>0</td>
</tr>
<tr>
<td>Secondary instrument(s):</td>
<td>4</td>
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<tr>
<td>Voice principals elect piano, MU 130-230</td>
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<tr>
<td>Piano principals elect voice, MU 140-240</td>
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<tr>
<td>Instrument principals elect the following courses:</td>
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<tr>
<td>Percussion, MU 184</td>
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<tr>
<td>Strings, MU 154, 254</td>
<td></td>
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<tr>
<td>Woodwinds, MU 164, 264</td>
<td></td>
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<tr>
<td>Brasses, MU 174, 274 (one course to be deleted in principal instrument area)</td>
<td></td>
</tr>
<tr>
<td>Ensembles**</td>
<td>3-6</td>
</tr>
<tr>
<td>MU 101, 102, 201, 202, 203 Theory-Harmony</td>
<td>10</td>
</tr>
<tr>
<td>MU 104, 105, 204, 205, 206 Musicianship Skills</td>
<td>5</td>
</tr>
<tr>
<td>MU 110 Introduction to Music Listening</td>
<td>3</td>
</tr>
<tr>
<td>MU 311, 312 Music History</td>
<td>6</td>
</tr>
<tr>
<td>MU 401 Twentieth-Century Materials and Techniques</td>
<td>3</td>
</tr>
<tr>
<td>MU 416 Orchestration</td>
<td>2</td>
</tr>
<tr>
<td>MU 325 Conducting</td>
<td>2</td>
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<tr>
<td>MU 425 Advanced Conducting and Instrumentation</td>
<td>2</td>
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<tr>
<td>Music Education</td>
<td></td>
</tr>
<tr>
<td>MUE or ED 326 Teaching General Music in Elementary Schools</td>
<td>3</td>
</tr>
<tr>
<td>MUE or ED 327 Teaching General Music in Secondary Schools</td>
<td>3</td>
</tr>
<tr>
<td>MUE 428 Organizing and Directing Vocal Groups in Secondary Schools</td>
<td>2</td>
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<tr>
<td>or</td>
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<tr>
<td>MUE 429 Organizing and Directing Instrumental Groups</td>
<td>2</td>
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<tr>
<td>in Secondary Schools</td>
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<tr>
<td>Professional Education</td>
<td></td>
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<tr>
<td>ED 230 Human Development</td>
<td>3</td>
</tr>
<tr>
<td>ED 261 Foundations of Education in U.S.</td>
<td>3</td>
</tr>
<tr>
<td>ED 263 Educational Psychology</td>
<td>3</td>
</tr>
<tr>
<td>ED 408 Teaching Reading in the Secondary School</td>
<td>3</td>
</tr>
<tr>
<td>ED 490 Principals of High School Teaching</td>
<td>3</td>
</tr>
<tr>
<td>ED 492, 498 Student Teaching***</td>
<td>9</td>
</tr>
</tbody>
</table>

**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 student teaching. ED 490 must be taken concurrently with student teaching.
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:
This curriculum may require more than 128 hours for the degree.

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 ............................................. 6

27 hrs.

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 is necessary (3 hours upper-level), including the following courses:
Studio Instruction 1-0 and 2-0 (6 terms) .............................. 4
Music Theory 101, 102, 201 ......................................... 9
Introduction to Music Listening 110 ................................. 3
Music History 312 ..................................................... 3
Ensemble .................................................................. 6

25 hrs.

Music (MU)

100 Fundamental of Music ............................................... 3 hrs.
Basic music presented in a practical way for student who has little or no musical training. Mechanical aspects of music—clefs, notation, scales, intervals, and rhythm with some practice in writing and harmonizing melodies. A remedial course for students who expect to major or minor in music, and they will not receive degree credit for course.

101 Theory of Music I ................................................... 2 hrs.
Fundamentals of basic musicianship through practical as well as theoretical studies. Development of skills in written harmony and formal analysis. Appropriate Musicianship skills (MU 104) to be taken concurrently. Prerequisite: approval of instructor.

102 Theory of Music II .................................................. 2 hrs.
Continuation of MU 101. Prerequisite: MU 101 and 104.

104 Musicianship Skills I ............................................... 1 hr.
To be taken concurrently with MU 101 and designed to complement written theoretical studies. Exercises in sight singing using solfege, numbers, or neutral syllables. Basic
conducting (beat patterns), rhythmic execution and melodic, harmonic, and rhythmic
dictation. Prerequisite: approval of instructor.

105 Musicianship Skills II
Continuation of MU 104. Prerequisite: MU 101 and 104.

109 Creative Dance (Basic Modern Technique)
Time and space through movement. Proper body placement, control, and agility while
thinking creatively. No dance experience necessary.

110 Introduction to Music Listening
Basic appreciation course. Ideas and issues in types of world music through listening,
reading, and discussion.

111 American Folk Music and Jazz
History and development of American folk music and jazz. Current developments.

112 Trends in Popular and Commercial Music
Popular music stemming from folksongs, blues, and dance hall music. Rock music
from the beginning; Bill Haley, Elvis Presley, the Beatles, and the growth of the re­
cording industry. Field trip to a recording studio and discussion of local performances.
Social-economic aspects of the music industry.

201 Theory of Music III
Continuation of studies on a more advanced basis than MU 101-102. Prerequisite: MU
102 and 105.

202 Theory of Music IV
Continuation of MU 201. Prerequisite: MU 201 and 204.

203 Theory of Music V
Continuation of MU 202. Prerequisite: MU 202 and 205.

204 Musicianship Skills III
Continuation of MU 105. Prerequisite: MU 102 and 105.

205 Musicianship Skills IV
Continuation of MU 204. Prerequisite: MU 201 and 204.

206 Musicianship Skill V
Continuation of MU 205. Prerequisite: MU 202 and 205.

208 Contemporary Dance Techniques
Achievement of flexibility, physical grace, and coordination required of a dance. Pre­
quisite: audition or approval of instructor.

209 Environmental Dance (summer only)
Physical and psychological interaction with different environmental settings. Evalua­
tion 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 for exposure to great music. Focus on live experiences
with music and musicians. Classes with live performances, records, films, and informal
discussion with musicians.

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 2 hrs.
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 3 hrs.
Important aspects of American musical art, including the Colonial period, folksong and European influences, jazz and popular influences, and the contemporary period beginning with Charles Ives.

311 History of Music I 3 hrs.
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, 110, or approval of instructor.

312 History of Music II 3 hrs.
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. Prerequisite: MU 201, 110, or approval of instructor.

313 Survey of a Musical Form 3 hrs.
A musical form from its origins to present time. Variable topics. Prerequisite: MU 203, and 311 or 312.

314 Biographical Survey 3 hrs.
Life and work of great composers of music. Variable topics. Prerequisite: MU 203, and 311 or 312.

320 Piano Pedagogy 2 hrs.
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 1 hr.
Development of keyboard instruments, use of equal-temperament tuning, and minor piano action regulation, and repair. Offered on demand. Prerequisite: ability to read music.

325 Conducting 2 hrs.
Basic techniques of choral and instrumental conducting. Prerequisite: MU 103 or approval of instructor.

401 Twentieth Century Materials and Techniques 3 hrs.
Systems of tonal organizations, compositional procedures, terminology, and analytical methods that relate to music of our century. Prerequisite: MU 202 and 312 or approval of instructor. Offered alternate years.

410 Piano Literature 2 hrs.
Music for string keyboard instrument from the pre-pianoforte period to the present. Representative works from all periods. Prerequisite: MU 202, 312 or permission of instructor. Offered on demand.

411 Musicum Practicum 1 hr.
Courses of study and activity developed by the student(s) and submitted to Music faculty for approval. Projects to reinforce learning and performance experience. May be repeated, but no more than 2 hours count toward degree requirements.

416 Orchestration 2 hrs.
Instruments of the band and orchestra, their ranges, transpositions, and capabilities. Practical experience in arranging for instruments.
425 Advanced Conducting  
Review of basic conducting patterns. Emphasis on communication as the role of the conductor. Detailed score preparation and marking. Final project: actual 20 minute rehearsal of a university ensemble.

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 325; junior standing in music; 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 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.
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>130</td>
<td>Studio Instruction in Keyboard (piano and organ)¹</td>
<td>2/3</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>230</td>
<td>Studio Instruction in Keyboard²</td>
<td>2/3</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: MU 130 and approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>330</td>
<td>Studio Instruction in Keyboard²</td>
<td>2/3</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: MU 230 and approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>430</td>
<td>Studio Instruction in Keyboard²</td>
<td>2/3</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: MU 330 and approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>131, 132, 133, 231, 233, 331, 332, 333, 431, 432, 433</td>
<td>Studio Instruction in Keyboard ¹</td>
<td>1/3</td>
</tr>
<tr>
<td></td>
<td>For principal instrument music credit. Studio instruction fee: Level 7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prerequisite: approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>140</td>
<td>Studio Instruction in Voice ¹</td>
<td>2/3</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>240</td>
<td>Studio Instruction in Voice ²</td>
<td>2/3</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: MU 140 and approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>340</td>
<td>Studio Instruction in Voice ²</td>
<td>2/3</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: MU 240 and approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>440</td>
<td>Studio Instruction in Voice ²</td>
<td>2/3</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: MU 340 or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>150</td>
<td>Studio Instruction in Strings (orchestral strings and guitar)¹</td>
<td>2/3</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>250</td>
<td>Studio Instruction in Strings ²</td>
<td>2/3</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: MU 150 and approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>350</td>
<td>Studio Instruction in Strings ²</td>
<td>2/3</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: MU 250 and approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>450</td>
<td>Studio Instruction in Strings ²</td>
<td>2/3</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: MU 350 and approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>151, 152, 153, 251, 252, 253, 351, 352, 353, 451, 452, 453</td>
<td>Studio Instruction in Strings ¹</td>
<td>1/3</td>
</tr>
<tr>
<td></td>
<td>For principal instrument music credit. Studio instruction fee: Level 7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prerequisite: approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>154, 254</td>
<td>Class Instruction in Strings</td>
<td>2/3</td>
</tr>
<tr>
<td></td>
<td>For secondary instrument, music education emphasis students. Studio instruction fee: Level 6</td>
<td></td>
</tr>
<tr>
<td>160</td>
<td>Studio Instruction in Woodwinds ¹</td>
<td>2/3</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>260</td>
<td>Studio Instruction in Woodwinds ²</td>
<td>2/3</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: MU 160 and approval of instructor.</td>
<td></td>
</tr>
</tbody>
</table>

¹For music education emphasis, secondary instrument, or non-music credit. Course may be repeated. Studio instruction fee: Level 6

²For music education emphasis or secondary instrument credit. Course may be repeated. Studio instruction fee: Level 6
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>360</td>
<td>Studio Instruction in Woodwinds²</td>
<td>2/3 hr.</td>
<td>MU 260 and approval of instructor.</td>
</tr>
<tr>
<td>460</td>
<td>Studio Instruction in Woodwinds²</td>
<td>2/3 hr.</td>
<td>MU 360 and approval of instructor.</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 1/3 hrs.</td>
<td>For principal instrument music credit. Studio instruction fee: Level 7.</td>
</tr>
<tr>
<td>164, 264</td>
<td>Class Instruction in Woodwinds</td>
<td>2/3 hr.</td>
<td>For secondary instrument music education emphasis students. Studio instruction fee: Level 6.</td>
</tr>
<tr>
<td>170</td>
<td>Studio Instruction in Brass¹</td>
<td>2/3 hr.</td>
<td>Approval of instructor.</td>
</tr>
<tr>
<td>270</td>
<td>Studio Instruction in Brass²</td>
<td>2/3 hr.</td>
<td>MU 170 and approval of instructor.</td>
</tr>
<tr>
<td>370</td>
<td>Studio Instruction in Brass²</td>
<td>2/3 hr.</td>
<td>MU 270 and approval of instructor.</td>
</tr>
<tr>
<td>470</td>
<td>Studio Instruction in Brass²</td>
<td>2/3 hr.</td>
<td>MU 370 and approval of instructor.</td>
</tr>
<tr>
<td>174, 274</td>
<td>Class Instruction in Brass</td>
<td>2/3 hr.</td>
<td>For secondary instrument, music education emphasis students. Studio instruction fee: Level 6.</td>
</tr>
<tr>
<td>180</td>
<td>Studio Instruction in Percussion¹</td>
<td>2/3 hr.</td>
<td>Approval of instructor.</td>
</tr>
<tr>
<td>280</td>
<td>Studio Instruction in Percussion²</td>
<td>2/3 hr.</td>
<td>MU 180 and approval of instructor.</td>
</tr>
<tr>
<td>380</td>
<td>Studio Instruction in Percussion²</td>
<td>2/3 hr.</td>
<td>MU 280 and approval of instructor.</td>
</tr>
<tr>
<td>480</td>
<td>Studio Instruction in Percussion²</td>
<td>2/3 hr.</td>
<td>MU 380 and approval of instructor.</td>
</tr>
<tr>
<td>181, 182, 183, 281, 282, 283, 381, 382, 383, 481, 482, 483</td>
<td>Studio Instruction in Percussion</td>
<td>1 1/3 hrs.</td>
<td>For principal instrument music credit. Studio instruction fee: Level 7. Prerequisite: approval of instructor.</td>
</tr>
<tr>
<td>184</td>
<td>Class Instruction in Percussion</td>
<td>2/3 hr.</td>
<td>For secondary instrument, music education emphasis student. Studio instruction fee: Level 6.</td>
</tr>
</tbody>
</table>

¹For music education emphasis, secondary instrument, or non-music credit. Course may be repeated. Studio instruction fee: Level 6

²For music education emphasis or secondary instrument credit. Course may be repeated. Studio instruction fee: Level 6
Ensembles

The several UAH music ensembles are open to all students some of whom require some audition. Ensemble participation is essential for all music majors and minors, and appropriate ensemble should be selected each term a student is enrolled. A maximum of 6 semester hours in ensemble courses (MU 190-199, 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 1 hr.
Mixed voices singing the serious choral repertoire. Open to all students by audition.

191, 391 Premier Singers 1 hr.
Mixed voices singing pop and folk music.

192, 392 Huntsville Village Singers 1/2 hr.
A select small ensemble of mixed voices. Open to all students by audition.

193 Summer Chorus 1 hr.
Mixed voices singing a variety of choral music.

195 Music for Awhile Ensemble 1 hr.
Solo-ensemble performance specializing in early and contemporary music.

196 Chamber Ensembles 1 hr.
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 1 hr.
Rehearsal and performance of a variety of music for concert band. By audition with conductor.

198, 398 Huntsville Symphony Orchestra 1 hr.
The Civic Symphony 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 1 hr.
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.

297 Jazz Workshop 1 hr.
Two broad opportunities for students who participate; performance of jazz, both written and improvised, and instruction in jazz arranging, composition, and improvisation. Performing ability required. By audition with instructor.

299 University Brass 1 hr.
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)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
<th>Description</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>225</td>
<td>Introduction to Music Education</td>
<td>1 hr.</td>
<td>Philosophical orientation into music teaching. Observation and mini-teaching experiences with follow-up discussions. Prerequisite: MU 201, 110, or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>326</td>
<td>Teaching General Music in Elementary Schools</td>
<td>3 hrs.</td>
<td>Materials and methods. Emphasis on developing teaching competencies. Prerequisites: MU 201, 110 or permission of instructor.</td>
<td></td>
</tr>
<tr>
<td>327</td>
<td>Teaching General Music in Secondary Schools</td>
<td>3 hrs.</td>
<td>Materials and methods. Emphasis on developing teaching competencies. Prerequisite: MU 201, 110 or permission of instructor.</td>
<td></td>
</tr>
<tr>
<td>428</td>
<td>Organizing and Directing Vocal Groups in Secondary Schools</td>
<td>2 hrs.</td>
<td>Repertoire, procedures for administering and teaching school glee clubs, choirs, and vocal ensembles. Prerequisite: MUE 326, 327 and MU 425 or permission of instructor.</td>
<td></td>
</tr>
<tr>
<td>429</td>
<td>Organizing and Directing Instrumental Groups in Secondary Schools</td>
<td>2 hrs.</td>
<td>Repertoire, procedures for administering and teaching school bands, orchestras and instrumental ensembles. Prerequisites: MUE 326, 327 and MU 425 or permission of instructor.</td>
<td></td>
</tr>
</tbody>
</table>
Philosophy Program

Assistant Professor Brumett

The philosophy program aims at deepening one's understanding of all activities of the human mind and their interconnection, broadening his perspectives, and developing his ability to think clearly, systematically, and independently.

Beginning students should take PHL 101. Prerequisites will occasionally be waived for students interested in particular branches or periods of philosophy. Such requests must be approved by instructor.

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.

Philosophy (PHL)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Introduction to Philosophy</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Fundamental problems of experience.</td>
<td></td>
</tr>
<tr>
<td>102</td>
<td>Introduction to Logic</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Methodology of correct reasoning</td>
<td></td>
</tr>
<tr>
<td>103</td>
<td>Introduction to the Philosophy of Art</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Major theories of art from Plato to the present day. Analysis of concepts of art in common among such theories.</td>
<td></td>
</tr>
<tr>
<td>104</td>
<td>Introduction to Social and Political Philosophy</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Major attempts to justify exercise of political power at the expense of individual liberty from Plato to Mill.</td>
<td></td>
</tr>
<tr>
<td>105</td>
<td>Introduction to Ethics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Major theories of ethics from Aristotle to Utilitarianism and major theories about theories of ethics from naturalism to prescriptivism.</td>
<td></td>
</tr>
<tr>
<td>106</td>
<td>Introduction to the Philosophy of Religion</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>201</td>
<td>History of Western Philosophy</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>From the earliest Greek philosophers to Plato. Pre-Socratic philosophers, Socrates, and Plato, with emphasis on Plato.</td>
<td></td>
</tr>
<tr>
<td>202</td>
<td>History of Western Philosophy</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>203</td>
<td>History of Western Philosophy</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Seventeenth-century philosophers such as Descartes and Spinoza. Prerequisite: PHL 101 or one course in history of philosophy or approval of instructor.</td>
<td></td>
</tr>
</tbody>
</table>
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 3 hrs.
Eighteenth-century philosophers such as Leibniz, Locke, Berkeley, and Hume. Prerequisite: PHL 101 and one course in the history of philosophy or approval of instructor.

305 History of Western Philosophy 3 hrs.
Kant and nineteenth-century philosophers such as Kant, Hegel, and Nietzsche. Prerequisite: PHL 101 and one course in the history of philosophy or approval of instructor.

306 Contemporary European Philosophy 3 hrs.
Twentieth-Century European philosophers such as Bergson, Husserl, Heidegger, and Sartre, with emphasis on phenomenology and existentialism. Prerequisite: PHL 101 and one course in the history of philosophy or approval of instructor.

312 Contemporary Anglo-Saxon Philosophy 3 hrs.
Twentieth-century philosophers such as James, Bertrand, Russell, Carnap, and Wittgenstein, with emphasis on pragmatism, logical atomism, logical positivism, and philosophical analysis. Prerequisite: PHL 101 and one course in the history of philosophy or approval of instructor.

320 Symbolic Logic 3 hrs.
Symbolic deductive logic, including propositional calculus (truth-functional logic), predicate calculus (propositional functions and quantification), and the logic of relations. Prerequisite: PHL 102.

322 Inductive Logic 3 hrs.
Nonsymbolic inductive logic, including some problems of the philosophy of science. Prerequisite: PHL 102.

332 Epistemology 3 hrs.
Critical investigation of fundamental problems of knowledge such as knowledge and belief, truth, certainty and skepticism, perception, logic, explanation, and justification. Prerequisite: 9 hours of philosophy including PHL 101 or approval of instructor.

342 Metaphysics 3 hrs.
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. Prerequisite: 9 hours of philosophy including PHL 101 or approval of instructor.

352 Ethics 3 hrs.
Investigation of fundamental problems of conduct such as good and evil, right and wrong, rights and obligations, values and ways of life. Prerequisite: 6 hours of philosophy including PHL 101 or approval of instructor.

362 Political Philosophy I 3 hrs.
Historical survey and philosophical analysis of fundamental ideas of representative thinkers in Western political theory from Plato to Hobbes. (Same as PSC 362).

363 Political Philosophy II 3 hrs.
Historical survey and philosophical analysis of fundamental ideas of representative thinkers in Western political theory from Locke to Marx. (Same as PSC 363).

385 Selected Topics in the History of Philosophy 3 hrs.
Intensive examination of particular problems, periods, or movements in the history of philosophy. Prerequisite: Determination in accordance with course content.
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, HBS 231 (statistics), and a minimum of 15 semester hours in courses numbered 300 or above, including PSC 400 and 499.

A student developing an area of concentration with a political science major must choose a minor consisting of 21 semester hours of courses from a discipline other than political science. At least 6 hours in the minor must be in courses numbered 300 or above. Instead of a minor, the student has the option of choosing 21 hours in 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 adviser in the department during their freshman year. GER should include MA 105 (College Algebra) unless placement tests indicate Level II or above. Transfer students are advised to consult with a faculty member in the department before scheduling courses.

Sophomores must file an AOC declaration before the end of their sophomore year. The AOC gives the student opportunity to develop an academic program that meets his individual interests and objectives. 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, journalism, graduate-school preparation, criminal justice, and integrated studies with the social sciences, humanities or environmental sciences.

Preprofessional Training and Internships

Students majoring in political science may develop areas of concentration in three specific preprofessional areas: criminal justice, prelaw, and public administration. Students interested in these areas should contact advisers in the Political Science Department.

Public Administration is a cognate area offered in the Political Science Department. Required courses are PSC 202-State and Local Government, HBS 231-Statistical Analysis, PSC 310-Public Administration, PSC 313-American Federalism, PSC 410-Local Government and Metropolitan Problems. Supporting cognate studies may be chosen from business administration, recreational administration, and other disciplines.

The Political Science Department has an internship program for majors in political science, criminal justice, public administration, and prelaw. Internship bridges the gap between learning experience and entry into the profession. Interested juniors and seniors should apply to the Political Science Department.

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.

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 Political Science Education faculty adviser and approved by the chairman of the Department of Political Science. This curriculum may require more than the minimum total of 128 hours for the degree.

### Political Science (PSC)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</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></td>
<td>Outstanding problems now confronting government in foreign and domestic policy.</td>
<td></td>
</tr>
<tr>
<td>201</td>
<td>Southern Politics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>The nation's most distinctive political region with consideration of both state and national politics.</td>
<td></td>
</tr>
<tr>
<td>202</td>
<td>State and Local Government</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Introduction to state and local politics in America. Different governmental forms and their impact on public policies. Structure of Alabama's governments.</td>
<td></td>
</tr>
<tr>
<td>205</td>
<td>European Governments</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Political systems of Great Britain, France, and West Germany.</td>
<td></td>
</tr>
<tr>
<td>247</td>
<td>English Constitutional History to 1603</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Condition of society and impact of ideas and social forces on historical developments and on origins and evolution of English governmental and legal institutions such as common law, parliament, the judiciary, and national administration. (Same as HY 247).</td>
<td></td>
</tr>
<tr>
<td>248</td>
<td>English Constitutional History since 1603</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Continuation of PSC 247. Impact of revolutions and industrialization upon English society, expansion of English liberties, and development of the cabinet, political parties, and the welfare state. (Same as HY 248).</td>
<td></td>
</tr>
</tbody>
</table>

Courses listed below are open to students who have completed 9 semester hours in political science or who have junior standing.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>305</td>
<td>Totalitarian Governments</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>The nature of totalitarianism and a study of political practices, ideologies, and behavior in selected communist and non-communist countries.</td>
<td></td>
</tr>
<tr>
<td>310</td>
<td>Public Administration</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Administrative principles and practices in public organizations and agencies.</td>
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<tr>
<td>313</td>
<td>American Federalism</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Function and importance of federalism as an aspect of the American political system. Role of the states as partners in the federal arrangement and their capacity to act as effective units of government.</td>
<td></td>
</tr>
<tr>
<td>315</td>
<td>International Politics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Factors underlying the conduct of international relations focusing upon evolution of the present state system. Problems of balance of power, bi-polarity, subsystems, and diplomacy.</td>
<td></td>
</tr>
<tr>
<td>325</td>
<td>Political Modernization</td>
<td>3 hrs.</td>
</tr>
</tbody>
</table>
|        | Growth and decay of struggling political systems, problems of modernization and
political responses to requirements of economic and social development. Countries of the Third World.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>327</td>
<td>Politics in China</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Overview of developments in China since 1900, with emphasis on politics of the People's Republic of China. Origins of the revolution, role and ideology of Mao-Tse-Tung, and political and economic modernization of China since 1949.</td>
<td></td>
</tr>
<tr>
<td>333</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>339</td>
<td>American Parties and Elections</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>The American party system, political participation, and the electoral process.</td>
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<tr>
<td>340</td>
<td>Political Behavior</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Sociological and psychological aspects of political behavior by citizens, activists, and leaders.</td>
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<tr>
<td>345</td>
<td>The Politics of Policy Making and Regulation</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Formation, adoption, implementation, and impact of public policies in America. Federal regulatory policy.</td>
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<tr>
<td>357</td>
<td>The American Congress</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
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<tr>
<td>358</td>
<td>The American Presidency</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>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.</td>
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<tr>
<td>359</td>
<td>Social Foundations of Revolutionary Change</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Revolution, violence, and extremist politics in the social and political process. (Same as SOC 359).</td>
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</tr>
<tr>
<td>362</td>
<td>Political Philosophy I</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Historical survey and philosophical analysis of fundamental ideas of representative thinkers in Western political theory from Plato to Hobbes. (Same as PHL 362).</td>
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<tr>
<td>363</td>
<td>Political Philosophy II</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Historical survey and philosophical analysis of fundamental ideas of representative thinkers in Western political theory from Locke to Marx. (Same as PHL 363).</td>
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<tr>
<td>364</td>
<td>American Political Thought</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Main currents in American political thought from its European antecedents to contemporary times.</td>
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<tr>
<td>371</td>
<td>American Constitutional Law</td>
<td>3 hrs.</td>
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<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>
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<tr>
<td>372</td>
<td>Civil Liberties</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Judicial interpretations of contemporary questions involving rights of individuals and limits of freedom of action in American society.</td>
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<tr>
<td>399</td>
<td>Directed Study in Political Science</td>
<td>1-3 hrs.</td>
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<tr>
<td></td>
<td>Independent studies in an area of political science selected in consultation with faculty adviser. Approval of chairman required.</td>
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</tbody>
</table>
Courses listed below are open to students who have completed 15 hours of political science or have senior standing.

400 Political Analysis 3 hrs.
Political Science and philosophy and logic of scientific inquiry. Data, bibliographic sources, and useful techniques in data analysis, including an introduction to simple computing for political scientists. Required of all students majoring in political science.

410 Local Government and Metropolitan Problems 3 hrs.
The structure and difficulties of local government in metropolitan areas. Relationship between political processes and problems of the contemporary metropolis.

425 Latin American Politics 3 hrs.
Social and political change in contemporary Latin America, with emphasis on Mexico, Cuba, Columbia, Peru, Chile, Argentina, and Brazil.

439 Problems in American Foreign Relations since 1939 3 hrs.
A study of selected problems in light of ideological conflicts, domestic factors, and national interest.

472 The American Judiciary 3 hrs.
The American judiciary; its institutional setting and the process of litigation, recruitment and socialization of judges, influences and limitations on judicial decisions within the political system.

493 Advanced International Politics 3 hrs.
Theoretical approaches to international politics with focus on systems theory, defense planning, and economic interaction. Prerequisite: PSC 315.

495 Internship in Government 1-6 hrs.
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.

499 Seminar in Political Science 3 hrs.
Open only to seniors. Required of students majoring in political science.

500 Studies in Political Science 1-3 hrs.
Special studies and projects in political science. Approval of chairman required.

Public Administration Program (PA)

Undergraduate students interested in Public Administration must see the chairman of the Department of Political Science to develop a program of supporting cognate studies for their area of concentration. Courses listed below are primarily for graduate students in the Administrative Science Program.

500 Studies in Political Science 1-3 hrs.
Special studies and projects in political science. (Same as PSC 500).

610 Intergovernmental Relations 3 hrs.
Comparison of administrative techniques in administration of diverse federal programs such as Model Cities, Appalachia, Defense, and Agriculture. Patterns of administration created by the nature of the program clientele and administrative traditions.

612 Public Personnel Administration 3 hrs.
Purposes, functions, and processes of personnel management at the national, state, and local levels.
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>615</td>
<td>Budgetary Processes</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Governmental revenue and expenditure policies. Budget as a method of administrative and fiscal control.</td>
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<tr>
<td>660</td>
<td>Public Policy Determination</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Political and economic implications of decision-making at national, state, and local levels.</td>
<td></td>
</tr>
<tr>
<td>668</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>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>
Psychology Department

Professor Rogers; Associate Professors Coffield, Hays, James, Sullins (chairman); Assistant Professor Hopkins.

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, 426, HBS 231, one experimental psychology course 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 HBS 231, and either one experimental psychology course 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)

103 General Psychology 3 hrs.
Empirical findings of major areas of psychology. General methodology, development, personality, and abnormal and social psychology.

113 Principles of Behavioral Analysis 3 hrs.
Principles governing relationship between behavior and environment. Reinforcement, extinction, discrimination, and chaining.

204 Laboratory Procedures 3 hrs.
Behavioral research techniques and descriptive statistics. Course includes laboratory. Fee: Level 3. Prerequisite: PY 103.

207 Psychology of Personal Adjustment 3 hrs.
Application of basic principles in psychology to origin and resolution of personal conflicts. Prerequisite: PY 103.

230 Decision Statistics 3 hrs.
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.

300 Experimental Psychology: Learning 4 hrs.
Reinforcement in acquisition and modification of behavior. Consideration of both empirical and theoretical material. Includes laboratory. Fee: Level 3. Prerequisite: PY 113, 230.

304 Experimental Psychology: Perception and Judgment 4 hrs.
Processing and interpretation of sensory information and decision processes. Includes laboratory. Fee: Level 3. Prerequisite: PY 103, HBS 231.

311 Individual Differences 3 hrs.
Factors, both learned and innate, that lead to individually unique patterns of behavior. Prerequisite: PY 103.

313 Psychometrics 3 hrs.
Theory and practice within psychological testing. Prerequisite: PY 103, HBS 231.

315 Developmental Psychology: Dependency 3 hrs.
Theories and issues of developmental process in humans and, to a limited extent, other forms of animal life. Both empirical evidence and phenomenological literature to produce an integrated approach to understanding continuity of ontological progression. Early stages of life. Prerequisite: PY 103.

316 Developmental Psychology: Transition 3 hrs.
Second course of sequence in study of ontological continuity. Continuation of PY 315 with emphasis on adolescence. Prerequisite: PY 103.

317 Developmental Psychology: Autonomy 3 hrs.
Third course of sequence in study of ontological continuity. Continuation of PY 316 with emphasis on adulthood. Prerequisite: PY 103.

318 Developmental Psychology: Completion 3 hrs.
Final course of sequence in study of ontological continuity. Continuation of PY 317 with emphasis on synthesis of multiple stages in ontological progression into a transcending theory of human development. Prerequisite: PY 103.

330 Communication Theory and Research 3 hrs.
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).

375 Social Psychology 3 hrs.
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).

390 Readings in Psychology 3 hrs.
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.

391 Special Topic in Psychology 1 hrs.
Study of preannounced special areas in seminar discussion, laboratory work, or practicum. Prerequisite: 15 hours PY. May be taken twice for credit.

392 Special Topic in Psychology 2 hrs.
Study of preannounced special areas in seminar discussion, laboratory work, or practicum. Prerequisite: 15 hours PY. May be taken twice for credit.

401 Personality 3 hrs.
Examination of various theories of personality with possible implications for research. Prerequisite: PY 103.

410 Human Research: Developmental 4 hrs.
Effects of environmental upon cognitive and social development in humans and animals. Includes laboratory. Fee: Level 3. Prerequisite: PY 315, 230.

411 Human Research: Motivation and Emotion 4 hrs.
Motivational and emotional dynamics relating to stress, depression, anxiety, and pleasure. Includes laboratory. Fee: Level 3. Prerequisite: 9 hours PY.

412 Human Research: Personality 4 hrs.
Basic problems, procedures, and theoretical issues involved in personality research. Includes laboratory. Fee: Level 3. Prerequisite: PY 401.

Topics in social psychology as applied to situations of practical interest. Includes laboratory. Fee: Level 3. Prerequisite: PY/SOC 375.

420 Seminar in Psychology 3 hrs.
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.

422 Individual Research 3 hrs.
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.

426 History and Systems in Psychology 3 hrs.
History of psychology as it has led to development of systematic study within the field. Prerequisite: 15 hours PY.

433 Abnormal and Health Psychology for the Human Service Professions 3 hrs.
Individual patterns and social contexts of integrative and maladaptive emotions and behavior. Prerequisite: PY 103.

435 Theories of Maladjustment 3 hrs.
Major behavior exceptionalities, with emphasis on empirical findings. Prerequisite: PY 401 or approval of instructor.
436 Physiological Psychology 3 hrs.
Neural and endocrinological systems underlying behavior. Prerequisite (either a or b):
(a) 15 hours of PY or approval of instructor; (b) BY 114 or BY 213 and 6 hours of PY or
approval of instructor. (Same as BY 436).

437 Symbolic Process 3 hrs.
Cognitive phenomena, including topics in psychology of language, imagination, and
other complex information-processing. Prerequisite: PY 300 or 304.

502 Industrial and Organizational Psychology 3 hrs.
Application of basic principles of learning, motivation, and perception to typical in­
dustrial and organizational problems.

503 Advanced General Psychology 3 hrs.
Survey. Various major areas of psychology. Open only to senior psychology majors.
Prerequisite: 24 hours PY and senior standing.

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 in Human Development 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 ex­
amples 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. Inferen­
tial 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 Tarter, Haralick, Hodges; Assistant Professors Burton (chairman), Grzyb, Chang.

Area of Concentration (AOC) with Sociology Major

Requirements for a major are 36 hours of sociology including SOC 100, 102, 300, 465, and HBS 231. 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 course work 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.

Sociology (SOC)

100 Introduction to Sociology 3 hrs.
Perspective methods, concepts, and general findings of the sociologist. Historical and conceptual development of sociology.

Lower-division sociology courses listed below are open to students who have completed SOC 100.

102 Analysis of Social Problems 3 hrs.
Sociological interpretation of contemporary social problems as they relate to significant trends in complex societies.

106 Marriage and Family 3 hrs.
The family as a social institution, its structure and function in contemporary societies, dating, marital interaction, life cycle, and socialization process.
Mass Media in America: Theory and Criticism 3 hrs.
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).

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. HBS 231 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.
340 Special Topics
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.

345 Social Gerontology
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.

350 Social Stratification
Social class, social status, and social mobility. Social power and prestige. Differential
opportunities and resultant behaviors of upper, middle, and lower social classes.

359 Social Foundations of Revolutionary Change
Role of revolution, violence, and extremist politics in social and political process. Major
focus on American social movements. (Same as PSC 359).

375 Social Psychology
Fundamental principles of group processes, social influence, and group structure.
Development of group solidarity, cohesion, intergroup conflict and cooperation, commu-
nication, leadership, opinion, propaganda, and suggestion. Prerequisite: PY 103 or
113. (Same as PY 375).

385 Complex Organization
Theory and structure of past and present complex organization on the large social struc-
ture. Military, industrial, and political bureaucracies.

390 Readings and Individual Research
Supervised readings or in-depth research or both in area of specialized interest to stu-
dent or instructor. Permission of instructor. May be taken twice for credit with
adviser’s approval.

400 Applied Research Methods
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 HBS 231 helpful but
not required. By invitation or approval of instructor.

420 The Sociology of Corrections and Rehabilitation
Social variables in restructuring behavior of social offender. Basic problems faced by
correctional institutions. (Same as CJ 420).

440 Sociology of Religion
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.

450 Medical Sociology
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 prob-
lems encountered.

452 Sociology of Mental Health
Social construction of mental health and mental illness. Mental hospitals, community
mental health center, and mental health movement.

455 Sociology of Work and Occupations
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.
Nursing Building
School of Nursing

Dean Etta Anne Hincker, B.S., M.S.N.E., Ed.D., Professor of Nursing

Professor Burge; Associate Professors Anderson, Baldwin, Baur, Cook, Douglas, Henze, Lloyd, Maines, Pearson, Perrin, Phillips, Reid, Warren, Williamson; Assistant Professors Appleton, Brisley, Copeland, Flood, Heaman, Holder, Pase, Williams; Adjunct Assistant Professor Derington, Jones; Instructors Calvert, Cash, Grissett, Reeves, Reumann, Smith; Clinical Instructors Mitchell, Oakley.

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.

Undergraduate Program

The undergraduate curriculum is divided into two components, the lower and upper divisions. Lower division courses establish scientific base for the future practice of nursing. The upper division concentrates on progressive experiences and professional nursing practice, as well as theory to support it. In the curriculum 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, (4) 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 1.0 (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 1.0 (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>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology (BY 114, 214, 313)</td>
<td>12</td>
</tr>
<tr>
<td>Chemistry (CH 101, 105, 113)</td>
<td>8</td>
</tr>
<tr>
<td>Mathematics (Level I)</td>
<td>3</td>
</tr>
<tr>
<td>(If placed at Level II or above, student may use 3 hours as an elective.)</td>
<td></td>
</tr>
<tr>
<td>Statistics (a statistics course offered in any department)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>26</td>
</tr>
</tbody>
</table>

| Social and Behavioral Sciences:                                                   |                |
| Sociology (SOC 100, 106)                                                          | 6              |
| Psychology (PY 103, 375)                                                          | 6              |
| Elective                                                                          | 3              |
|                                                                                 | 15             |

| 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              |
|                                                                                 | 18             |

| 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

Electives:
General elective ................................................................. 3
Upper division electives to complete cognate .............................. 6

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 adviser 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.

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.

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.

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 2.0 on a 3.0 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

Total Core Requirements: ................................................................. 23

In addition to the above 23 semester hours of required core courses, student selects one of the following three 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

Total Option I: ................................................................. 17

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

Total Option II: ................................................................. 17

Option III: Community Nursing
- Role Resocialization (NUR 640) ..................................................... 2
- Community Nursing (NUR 628, 629, 630) ....................................... 15

Total Option III: ................................................................. 17

205
The remaining 6 to 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.

**Summary**

A minimum of 46 semester hours is required for the Master of Science in Nursing degree. Twenty-three hours are required core courses of which 17 are from one of three options: teaching, supervision, or community nursing. 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)**

222 **Introduction to Professional Nursing** 2 hrs.
Evolution and scope of professional nursing, parameters of nursing education, health-care delivery systems, and health care-team in relation to nursing practice.

234 **Foundations of Nursing** 4 hrs.
Theoretical foundations and clinical skills of nursing practice including nursing process, levels of prevention, adaptation, communication, role, and health-care systems. Lab fee: Level 7. Prerequisite: NUR 222.

321 **Pharmacology in Nursing** 2-3 hrs.
Major drug classifications and therapeutic uses. Legal and ethical implications. Prerequisite: NUR 234.

322 **Nutrition in Nursing** 2 hrs.
Knowledge and principles of nutrition applied to individual health needs. Prerequisite: NUR 234.

325 **Human Sexuality** 2 hrs.
Theory and issues related to human sexuality in health and illness. Emphasis on both theory and values clarification of human sexuality issues. Prerequisite: Sophomore standing.

330 **Introduction to Health Assessment** 3 hrs.
Basic concepts and techniques of interviewing, history-taking, and physical assessment emphasizing normal findings. Prerequisite: NUR 361.

331 **Nursing Care of the Person with a Long-Term Illness** 3 hrs.
Effects of long-term illness on the growth, development, and adjustment of person and his family. Focus on family-centered nursing intervention emphasizing best possible adjustment to alterations in family life-style and promotion of high-level wellness within the family. Elective. Prerequisite: NUR 234, 361.

332 **Nursing Care of Persons Experiencing Surgical Interventions** 3 hrs.
Effect of surgical intervention on growth and development of the person and subsequent adjustment of himself and his family. Focus on family-centered intervention before, during, and after surgery. Promoting highest level of rehabilitation possible for individual and his family. Elective. Prerequisite: NUR 361 and approval of instructor.

333 **Nursing Care of Acutely Ill Child through Adolescence** 3 hrs.
Adaptation of acutely ill children through adolescence using a family-centered approach. Elective. Prerequisite: NUR 361 and approval of instructor.
334 Death and Dying 2-3 hrs.
Influence of death and dying upon attitudes and thinking gleaned from historical, cultural, philosophical, and scientific perspectives. Intimate reactions and beliefs concerning death and identifying coping resources. Elective.

335 Family-Centered Maternal-Infant Care 3 hrs.
Family-centered nursing emphasizing expanding family. Physiological and psychological effects of pregnancy on the family and need for maintaining and promoting high-level wellness in the family. Preparation of home and family for care of high-risk infant. Prerequisite: NUR 361, 372, and approval of instructor. Elective.

361 Bases of Nursing Practice 6 hrs.

372 Nursing Process in Care of the Adult 7 hrs.
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 7 hrs.
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.

390 Independent Study 2-4 hrs.
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 2 hrs.
Issues, trends, and professional parameters related to practice. Concurrent with NUR 473.

423 Research Process in Nursing 2 hrs.
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 3 hrs.
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 2-4 hrs.
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 7 hrs.

480 Nursing Process in Community Health 8 hrs.
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 8 hrs.
500 Special Topics 2-4 hrs.
Advanced study of underlying sciences and personal experiences in application of skills in selected area of interest in nursing. Elective. Prerequisite: approval of instructor.

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 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.
Continuation of previous knowledge of anatomy, physiology, adaptation, and disease process. Anticipated and existing physiological alterations as they affect the individual and the family.

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.

634 Curriculum Development in Nursing 3 hrs.
Current trends and research related to curriculum development in schools of nursing.

635 Teaching and Evaluation in Nursing 3 hrs.
Concepts and theories basic to teaching and learning. Application to nursing education, clinical instruction, and client education.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>636</td>
<td>Practicum in Teaching or Supervision</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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 AS 621, 624.</td>
<td></td>
</tr>
<tr>
<td>640</td>
<td>Concepts of Role Resocialization</td>
<td>2 hrs.</td>
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<tr>
<td></td>
<td>Seminar in leadership skills and role resocialization to enhance effectiveness of master’s prepared practitioner in community health. Corequisite with NUR 628.</td>
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</tr>
<tr>
<td>641</td>
<td>Issues in Professional Practice</td>
<td>2 hrs.</td>
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<tr>
<td></td>
<td>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.</td>
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</tr>
<tr>
<td>650</td>
<td>Independent Study</td>
<td>2-4 hrs.</td>
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<tr>
<td></td>
<td>The planning, implementation, and evaluation of related phenomena of special interest observed in nursing practice.</td>
<td></td>
</tr>
<tr>
<td>699</td>
<td>Thesis</td>
<td>6 hrs.</td>
</tr>
<tr>
<td></td>
<td>Independent research investigation related to practice of nursing under faculty guidance. Prerequisite: NUR 627.</td>
<td></td>
</tr>
</tbody>
</table>
School of Primary Medical Care

Dean Colin Campbell, A.B., M.D., C.M., Ed.M., Professor of Obstetrics and Gynecology

Community Medicine
Professors Bishop (chairman), Grant; Associate Professor Roberts; Assistant Professors Banahan, III; Schreeder (leave of absence 1981-82)

Emergency Medicine
Clinical Assistant Professor Throckmorton (chief) (volunteer faculty)

Family Medicine
Professors Bishop, Grant; Associate Professors Banahan, Jr. (interim chief), Knight, Roberts; Adjunct Associate Professor Fleming; Assistant Professors Aaron, Butler, McCarthy

Internal Medicine
Professor Sparks (chief); Associate Professors Boctor, Franco-Browder; Clinical Associate Professors Clabaugh, Williams; Assistant Professor Schreeder; Clinical Assistant Professors Boyer, Chandler, Hull; Adjunct Assistant Professor Burson

Medical Sociology
Professor McCalister

Microbiology
Associate Professor Moore

Obstetrics and Gynecology
Professors Campbell, Corner (chief); Assistant Professor DiPlacido; Clinical Instructor R. Harris

Pathology
Clinical Associate Professor Litkenhous; Lecturer Keebler
Pediatrics
Professor Montgomery (chief); Associate Professor Fleming; Clinical Associate Professor L. McKenzie; Research Associate Professor Sloyer; Clinical Assistant Professors Lester, Overbach, Ploussard, Quirante, Stewart

Psychiatry
Professors Froelich, Ritchey (chief); Clinical Assistant Professors Adams, Lindsay; Instructor Abbott; Lecturer Adams

Radiology
Clinical Assistant Professor T. McKenzie (chief)

Surgery
Clinical Associate Professors Berg, Kakani, Laughlin, Selah (chief), Walker; Clinical Assistant Professor Murray

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 pre dental baccalaureate programs are referred to the preprofessional adviser in the School of Science and Engineering through the Office of the Dean of the School of Science and Engineering.

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:

1. Diagnostic and therapeutic assessment of a broad range of clinical problems affecting persons of either sex in all age groups.
2. Knowledge of modern epidemiology, not only for infectious diseases, but also for chronic, malignant, genetic, and degenerative conditions.
3. Knowledge of the interrelationship of biological, psychological, sociological, and cultural variables in the health of an individual.
4. Knowledge and use of all available health professionals and community resources (consultation and referral) in the interest of the patient.
5. Ability to maintain a professional therapeutic relationship with large numbers of patients from a broad spectrum of personality types, behaviors, and clinical problems.
6. Practice organization and management, including the creation of a viable health-care team and the application of technology to the administration and business aspects of practice.
7. Knowledge and use of one’s self as a therapeutic agent, and the ability to avoid or manage the known biological and psychosocial hazards of the physician’s vocation.

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>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Introduction to the Health Professions</td>
<td>1 hr.</td>
</tr>
</tbody>
</table>

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 BY 100).
191 Emergency Medical Technician-Basic 3 hrs.
Basic techniques of prehospital stabilization in emergencies such as traumatic injuries, cardiac arrest, and other life-threatening health conditions. (Same as HPE 191).

192 Emergency Medical Technician-Basic Lab 1 hr.
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).

255 Emergency Medical Technician-Paramedic Training 6 hrs.
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.

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 8. 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

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 takes a four-week community medicine rural 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 curriculum.
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
Clinical 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 Epidemiology
Elective in Health Care Administration
Elective in Patient Education
Elective in Use of Vital Statistics
Community Medicine Preceptorship
Clinical Elective in Child Psychiatry
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 one or two family-practice faculty members 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 rotation to which they are assigned.

The curriculum for family practice is divided into two phases. The first phase is of nineteen months duration, the first year of which is very similar to a rotating internship with residents spending three months each on medicine, pediatrics, obstetrics and gynecology, and surgery.

The medicine rotation is an intensive in-hospital experience. The pediatric rotation consists of one month of office pediatrics, one month of in-patient general pediatrics, and one month of high-risk nursery experience. Obstetrics and gynecology, although basically a hospital rotation, includes activities in the Health Department Prenatal Clinic, community family-planning clinics, and ambulatory experience in the Ob/Gyn module of the Ambulatory Care Center. Surgery is two months of general surgery and one month of emergency medicine.

The additional rotations of Phase I include one month each of neurology, orthopedics, cardiology, and second year pediatrics. There is also a two-month block of general internal medicine during which the second- and third-year residents help to supervise and teach the first-year residents. A third month of general internal medicine is scheduled during Phase II.

The last half of the residency is spent mainly on family practice service. Residents see patients in their modules six to seven half-days a week. They also spend time each week gaining experience in otolaryngology, ophthalmology, dermatology, and radiology. Psychiatry is a longitudinal rotation taken concurrently with family practice early second year.
Residents spend five months of Phase II in electives and two months 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 are encountered in 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 570 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, a full-scale radiographic unit, 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.
School of Science and Engineering

Dean George T. Dimopoulos, B.S., M.S., Ph.D., Professor of Biological Sciences

The School of Science and Engineering offers programs leading to the Bachelor of Arts degree with majors in biology, mathematics, and mathematics education; the degree of Bachelor of Science in Engineering; the degree of Bachelor of Science with majors in biology, chemistry, mathematics, mathematics education, and physics. A certificate program in environmental science is offered to undergraduates majoring in sciences, mathematics, or engineering and to graduates with these majors. In addition, courses are offered in computer sciences, environmental science, natural sciences, and statistics.

The faculty of the School of Science and Engineering assists students in planning programs to meet various educational, vocational, and professional goals. Students may select programs of study for career opportunities in engineering, mathematics, life and physical sciences; for scientific background and requirements for professional studies in medicine and dentistry; to obtain elementary or secondary teacher certification; and to prepare for advanced study and research in engineering, mathematics, and the sciences.

The undergraduate program in engineering is founded on a broad-based course of study organized around a unified core curriculum. Options of specialization in engineering are chemical engineering, civil engineering, electrical engineering, industrial and systems engineering, and mechanical engineering. The program requires a number of courses in the liberal arts and emphasizes a strong support from the areas of mathematics, physics, and chemistry.

At the graduate level, the School of Science and Engineering offers programs that lead to the Master of Arts degree in mathematics, Master of Science degree in biology, chemistry, and computer science, Master of Science in Engineering degree with several areas of specialization (see section concerning engineering programs), Master of Science in Operations Research degree, and Master of Science degree in physics. The school also offers the Doctor of Philosophy degree in engineering (again with several areas of specialization), and the Doctor of Philosophy degree in physics. The Ph.D. degree in chemistry and mathematics can be obtained through a cooperative program with the University of Alabama with one-year residency at the Tuscaloosa campus.
Programs are administered by eight academic departments, the Office of Science and Engineering, and the Office of the School of Graduate Studies. Specific departmental degree requirements along with course descriptions are listed in the sections that follow. Because of its unified nature, the entire engineering program (both undergraduate and graduate) is presented in a single separate section. For additional information concerning environmental science and natural science programs, see respective sections (arranged alphabetically).
Biological Sciences Department

Professors Adams, Dimopoullos, Leonard; Adjunct Professor Montgomery; Associate Professors Campbell, Clark, Eley, Wilson (chairman); Adjunct Associate Professor Moore; Assistant Professors Evans, Lawton, Modlin; 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 biology to some of the humanities, social sciences, and economics.

The biology program must include BY 113/114 or the equivalent although these cannot be counted toward a major. They will satisfy a portion of the general education requirements (GER), however, a major in biology includes the following core courses: one course in anatomy and morphology (BY 313/314, 317, 371, 372, 544, or 571), one course in physiology (BY 313/314, 435, 531, 532, or 561), general genetics (BY 319), one course in biochemistry (may be included in major or minor as BY 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. BY 313 or 314 each can satisfy only the anatomy or the physiology requirement. BY 313 and 314 together can meet both the anatomy and physiology core requirements. BY 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 biology 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 biology 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. Biology 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 biology consists of 21 semester hours that include BY 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 biology minor. A course in biochemistry (BY or CH 301) supports the minor but is not required.
# Curriculum I

B.A. degree appropriate for biology major with an associated minor in social sciences.

<table>
<thead>
<tr>
<th>Course</th>
<th>Minimum Hours</th>
<th>Maximum Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER (humanities and social sciences)</td>
<td>30-36</td>
<td></td>
</tr>
<tr>
<td>Biology core courses and biology electives</td>
<td>30-32</td>
<td></td>
</tr>
<tr>
<td>Chemistry (to include 113 or 331)</td>
<td>8-11</td>
<td></td>
</tr>
<tr>
<td>Physics</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Mathematics</td>
<td>3-6</td>
<td></td>
</tr>
<tr>
<td>Humanities, social sciences, economics, or associated cluster</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td>27-30</td>
<td></td>
</tr>
</tbody>
</table>

# Curriculum II

B.S. degree for secondary teachers of biology and chemistry.

Because of recent changes by the State Board of Education in its teacher certification requirements, the department is not able at catalog deadline time to provide final state-approved listing of requirements in various program areas. These requirements will be published by the university as soon as they receive final state approval.

# Curriculum III

B.S. degree, preparatory for general graduate study.

<table>
<thead>
<tr>
<th>Course</th>
<th>Minimum Hours</th>
<th>Maximum Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER (humanities and social sciences)</td>
<td>30-36</td>
<td></td>
</tr>
<tr>
<td>Biology core courses and biology electives</td>
<td>30-32</td>
<td></td>
</tr>
<tr>
<td>Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Mathematics—(depending on placement)</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Physics—PH 101, 102 (PH 111, 112 may be taken)</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td>12-15</td>
<td></td>
</tr>
</tbody>
</table>

# Curriculum IV

B.S. degree with chemistry minor, preparatory for graduate study.

<table>
<thead>
<tr>
<th>Course</th>
<th>Minimum Hours</th>
<th>Maximum Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER (humanities and social sciences)</td>
<td>30-36</td>
<td></td>
</tr>
<tr>
<td>Biology core courses and biology electives</td>
<td>30-32</td>
<td></td>
</tr>
<tr>
<td>Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Mathematics—(depending on placement)</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Physics—PH 101, 102, 201, (PH 111, 112 may be taken)</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td>12-15</td>
<td></td>
</tr>
</tbody>
</table>

# Curriculum V

B.S. degree with physics-chemistry cognate studies, preparatory for graduate study.

<table>
<thead>
<tr>
<th>Course</th>
<th>Minimum Hours</th>
<th>Maximum Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER (humanities and social sciences)</td>
<td>30-36</td>
<td></td>
</tr>
<tr>
<td>Biology core courses and biology electives</td>
<td>30-32</td>
<td></td>
</tr>
<tr>
<td>Chemistry—CH 121, 123, 125, 126, 331, 332, 335, 361, 362</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Mathematics—(depending on placement)</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Physics—PH 111, 112, 201, 241, 331, 351</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

224
Curriculum VI
B.S. degree, premedical, predental, preveterinary. (See chemistry section for an alternate premedical curriculum.)

Semester Hours

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER (humanities and social sciences)</td>
<td>30-36</td>
</tr>
<tr>
<td>Biology core courses and biology electives (to include either BY 317 and 361 or BY 361, 543, 544, and 545)</td>
<td>30-32</td>
</tr>
<tr>
<td>Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 333, 335, 336 (341 desirable)</td>
<td>21</td>
</tr>
<tr>
<td>Mathematics—MA 121, 153, 154</td>
<td>9</td>
</tr>
<tr>
<td>Physics—PH 111, 112</td>
<td>8</td>
</tr>
<tr>
<td>Electives</td>
<td>16</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER (humanities and social sciences)</td>
<td>30-36</td>
</tr>
<tr>
<td>Mathematics (depending on placement)</td>
<td>9</td>
</tr>
<tr>
<td>Physics—101, 102, or 111, 112</td>
<td>8</td>
</tr>
<tr>
<td>Chemistry—121, 123, 125, 126, 223, 331, 332, 335, 361, 362</td>
<td>22</td>
</tr>
<tr>
<td>Electives (to include statistics if not in GER)</td>
<td>12</td>
</tr>
<tr>
<td>Biology (core courses and BY 221, 421, 430, 435, 521, 525)</td>
<td>33</td>
</tr>
</tbody>
</table>

Curriculum VIII
B.S. degree, premedical technology emphasis. This curriculum satisfies academic requirements for a B.S. in biology 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

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER (humanities and social sciences)</td>
<td>30-36</td>
</tr>
<tr>
<td>Physics—PH 101, 102</td>
<td>8</td>
</tr>
<tr>
<td>Mathematics (depending upon placement)</td>
<td>9</td>
</tr>
<tr>
<td>Biology—BY 221, 313, 314, 319, 421, 430, 521, 525, seminar</td>
<td>33</td>
</tr>
<tr>
<td>Chemistry—121, 123, 125, 126, 223, 331, 332, 335, 361, 362</td>
<td>22</td>
</tr>
<tr>
<td>Electives (CS 113 is recommended; statistics must be included if not in GER)</td>
<td>12</td>
</tr>
</tbody>
</table>

Curriculum IX
B.S. degree, preparatory for graduate study in biology-mathematics (biometrics).

Semester Hours

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER (humanities and social sciences)</td>
<td>30-36</td>
</tr>
<tr>
<td>Biology core courses and biology electives</td>
<td>30-32</td>
</tr>
</tbody>
</table>
Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362 ................. 22
Mathematics—MA 153, 154, 233, 244, 251, 385, 585 ......................... 21
Physics—PH 101, 102, or 111, 112 ........................................ 8
Electives (ST 281, 287 recommended) .................................. 12

Curriculum X
B.S. degree, environmental biology emphasis, preparatory for graduate study in ecology or environmental science.

Semester Hours
GER (humanities and social sciences) ....................................... 30-36
Biology core courses, biology electives, and BY 221, 312, 371 or 378, and two from BY 561, 562, 563, and 564 ............................... 30
Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362 ............. 22
Physics—PH 101, 102, or 111, 112 .......................................... 8
Mathematics—(including ST 281 if Level III placement) .......................... 9
Environmental science—ES 102 ............................................... 4
Computer science—CS 113, 208 ............................................... 6
Electives (to include statistics if not mathematics Level III placement) ........... 12

Curriculum XI
B.S. degree, composite major in biology-environmental sciences. An additional 6 hours from advanced ES courses with this program qualifies student for an environmental science certificate.

Semester Hours
GER (humanities and social sciences, EC or PSC recommended) ................... 36
Mathematics (including ST 281 if Level III placement) .......................... 9
Physics—PH 101, 102, or 111, 112 ........................................... 8
Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362 ............. 22
Environmental science—ES 102, 303, or 304, 311, 321 .......................... 13
Biology—BY 113, 114, 221, 312, 319, and MS 507, BY 531, or BY 561 .......... 23
BY electives .......................................................... 12-14
One from 315, 317, 378 ................................................... 4-5
One from 562, 563, 564 ................................................... 4
One from 364, 368, 372 ................................................... 4-5
Computer science—CS 113 ................................................... 3
Free electives (to include statistics if not MA Level III placement) ............... 9-11

Graduate Program
The biology graduate faculty in cooperation with the biology graduate faculty of Alabama Agricultural and Mechanical University (A&MU) offers courses in biology to satisfy requirements for a Master of Science degree in biology with emphasis in cell and development biology, ecology, entomology, genetics and molecular biology, microbiology, physiology, and systematics. A minimum of 25 percent of biology 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 and 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, have completed 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.

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 biology major or minor, a minor in marine sciences, or a Master of Science degree in biology. Biology 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 biology 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.

Biology (BY)

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 BY 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: BY 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 BY 221 or advanced microbiology courses. Two 2-hour labs a week. Lab fee: Level 4. Prerequisites: BY 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 BY 214. Take no later than sophomore year. Lab fee: Level 4. Prerequisite: BY 114, 113; CH 101 or 121 or equivalents.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
<th>Prerequisites/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>230</td>
<td>Cultivation of Shrubs and Basic Landscape Principles</td>
<td>2 hrs.</td>
<td>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 2. Prerequisite: BY 113 or equivalent.</td>
<td></td>
</tr>
<tr>
<td>238</td>
<td>Local Flora</td>
<td>2 hrs.</td>
<td>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.</td>
<td></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: BY 114 and CH 113 or 123. (Same as CH 301).</td>
<td></td>
</tr>
<tr>
<td>312</td>
<td>Principles of Ecology</td>
<td>4 hrs.</td>
<td>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: BY 113, 114, BY 238, CH 121.</td>
<td></td>
</tr>
<tr>
<td>313</td>
<td>Anatomy and Physiology I</td>
<td>4 hrs.</td>
<td>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 3. Prerequisite: BY 114, CH 101, and 105 (CH 113 recommended).</td>
<td></td>
</tr>
<tr>
<td>314</td>
<td>Anatomy and Physiology II</td>
<td>4 hrs.</td>
<td>Continuation of BY 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 3. Prerequisites: BY 313, CH 101 and 105 (CH 113 recommended).</td>
<td></td>
</tr>
<tr>
<td>319</td>
<td>General Genetics</td>
<td>3 hrs.</td>
<td>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: BY 114 and CH 101 or equivalent.</td>
<td></td>
</tr>
<tr>
<td>320</td>
<td>Genetics Laboratory</td>
<td>1 hr.</td>
<td>Practical applications of modern genetic techniques. One 3-hour lab a week. Lab fee: Level 3. Prerequisite or concomitant: BY 319.</td>
<td></td>
</tr>
<tr>
<td>340</td>
<td>Introduction to Cellular and Developmental Biology</td>
<td>4 hrs.</td>
<td>Modern approach to embryology relating cell structure and function to mechanisms involved in development. One laboratory a week. Lab fee: Level 3. Prerequisite: BY 114, CH 101, 105, 113 or 331. BY 319 recommended. It is strongly recommended that biology majors and preprofessional students take BY 543, 544, and 545 instead of BY 340.</td>
<td></td>
</tr>
</tbody>
</table>
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. Prerequisite: BY 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. Prerequisite: BY 113, 114, 312.

368 Dendrology 4 hrs.
Sequel to local flora BY 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 2. Prerequisite: BY 113, BY 238 recommended.

371 Nonvascular Cryptogamic Botany 5 hrs.
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: BY 113.

372 Biology of Vascular Plants 5 hrs.
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 4. Prerequisite: BY 113.

378 Invertebrate Zoology 5 hrs.
Invertebrate phyla emphasizing anatomy, morphology, embryology, ecology, and phylogenetic relationships. Two 3-hour labs a week. Lab fee: Level 4. Prerequisite: BY 114.

421 Introduction to Medical Microbiology 5 hrs.
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: BY 221, BY or CH 361, and BY 430 recommended.

429 Animal Histology 4 hrs.
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 4. Prerequisite: BY 114 or equivalent.

430 Immunology 4 hrs.
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: BY 221 and biochemistry strongly recommended.

435 Bacterial Physiology and Metabolism 4 hrs.
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: BY 221. Biochemistry strongly recommended.
436 Physiological Psychology 3 hrs.
Functional analysis of neural and endocrine systems underlying behavior. Prerequisites: (either a or b): (a) 15 hrs. of PY or approval of instructor; (b) BY 114 or 213, and 6 hrs. of PY or approval of instructor. (Same as PY 436).

455 General Entomology 4 hrs.
Classification, habits, and economic importance of insects including their collection, preservation and identification. One 3-hour lab a week. Lab fee: Level 3. Prerequisite: BY 114.

464 Speciation and Evolution 3 hrs.

490 Special Topics in Biology 1-4 hrs.
Literature search relative to topics of special interest under direct supervision of instructor.

492 Undergraduate Research 2-4 hrs.
Individual investigations into biological problems under direct supervision of instructor. For advanced-level biology students with biology grade of 2.5 or 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. Biology major requirement, one seminar. No more than 3 seminar credits can count in biology 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: BY 421; BY 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: BY 221.
524 Mycology (UAH and A&MU) 4 hrs.
Lines of phycomycetes 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 4. Prerequisite: BY 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: BY 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: BY 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 biology; 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. Prerequisite: BY 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 BY 543 and selected morphogenesis of germ-layer derivatives. Prerequisite: BY 543.
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites</th>
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</thead>
<tbody>
<tr>
<td>545</td>
<td>Cellular and Developmental Biology Laboratory (UAH)</td>
<td>2 hrs.</td>
<td>Take course after BY 543 and concurrently with BY 544. Lab fee: Level 4.</td>
</tr>
<tr>
<td>546</td>
<td>Cytogenetics (A&amp;MU)</td>
<td>4 hrs.</td>
<td>Analysis of composition, morphology, and behavior of genes, especially as they relate to function, development, and heredity. Prerequisite: BIO 406.</td>
</tr>
<tr>
<td>547</td>
<td>Biochemistry I (UAH)</td>
<td>3 hrs.</td>
<td>Structural chemistry and function of biomolecules, mechanism of biochemical reactions, enzyme kinetics, and energy transfer. Prerequisite: CH 333 or CH or BY 361. (Same as CH 561).</td>
</tr>
<tr>
<td>548</td>
<td>Biochemistry II (UAH)</td>
<td>3 hrs.</td>
<td>Metabolism, biosynthesis of macromolecular precursors, storage, transmission, expression of genetic information, and molecular physiology. Prerequisite: CH 561 or BY 547. (Same as CH 562).</td>
</tr>
<tr>
<td>549</td>
<td>Analytical Biochemistry Laboratory (A&amp;MU)</td>
<td>2 hrs.</td>
<td>Advanced laboratory course dealing with modern techniques of molecular biology and biochemistry.</td>
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<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. Prerequisite: general entomology or equivalent, advanced biochemistry.</td>
</tr>
<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>
</tr>
<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. Prerequisite: BY 455.</td>
</tr>
<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: BY 312 or approval of instructor. BY 361 or 532 recommended.</td>
</tr>
<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. Prerequisite: BY 312 and taxonomy.</td>
</tr>
<tr>
<td>563</td>
<td>Population Ecology (UAH)</td>
<td>4 hrs.</td>
<td>Distribution, population dynamics and behavior of animal population in relation to environmental factors. One 4-hour lab a week. Lab fee: Level 3. Field trips required. Prerequisites: BY 312 and organic chemistry.</td>
</tr>
<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. Occa-</td>
</tr>
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</table>
sional Saturday field trips required instead of week's laboratory session. Lab fee: Level 4. Prerequisites: BY 312, 315, 371 or 378, or approval of instructor.

570 Plant Pathology (A&MU) 4 hrs.
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.

571 Plant Anatomy (UAH and A&MU) 4 hrs.
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. Prerequisite: BY 372 or approval of instructor.

572 Plant Taxonomy (A&MU) 4 hrs.
Principles of classifying, naming, and identifying vascular plants with emphasis on flowering plants. Ecologic factors influencing vegetational distribution.

580 Advanced Invertebrate Zoology (UAH) 4 hrs.
Phylogenetic consideration of the invertebrate, including structural, functional, embryological, and physiological relationships leading to an understanding of the complexity of animals. Laboratory and field trips. Lab fee: Level 3. Prerequisite: BY 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: BY 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: BY 361 and BY 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, teratogenesis, 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: BY 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.

643 Microscopy (UAH) 4 hrs.
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 cytochemistry. Lab fee: Level 4. Prerequisite: graduate standing and approval of instructor.

644 Topics in Cell and Developmental Biology and Biological Fine Structure (UAH) 2 hrs.
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: BY 543 and 643 or approval of instructor.

645 Human Cytogenetics and Its Clinical Application (A&MU) 3 hrs.
Review of normal human chromosome structure and normal chromosome segregation and morphology with clinical consideration.

646 Molecular Genetics (UAH and A&MU) 3 hrs.
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: BY 319 and BY-CH 361.

647 Enzymology (UAH) 4 hrs.
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: BY 542 or CH 561 or approval of instructor.

648 Enzymology Laboratory (UAH) 2 hrs.
Techniques of isolation, purification, and characterization of enzymes. Prerequisite: BY 647. Lab fee: Level 4.

651 Medical Entomology (UAH) 4 hrs.
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: BY 361 and 455 or approval of instructor.

Economic thresholds, economic injury levels, population dynamics, residues in food crops, chemical control, insect transmission of plant diseases, and livestock. Prerequisite: general entomology.
653 Taxonomy of the Immature Insect (UAH and A&MU) 4 hrs.
Studies of the literature, comparative morphology and techniques of identification of immature stages of the insect, methods of collecting and preserving the immatures. Prerequisite: BY 455 or approval of instructor.

660 Ecosystem Dynamics (UAH) 4 hrs.
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. Prerequisite: BY 564 and 562.

661 Advanced Population Ecology (UAH) 4 hrs.
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. Prerequisite: BY 312, BY 564 or 565, or approval of instructor.

672 Advanced Systematic Botany (A&MU) 4 hrs.
Classification, nomenclature, and taxonomic theory of vascular plants. Prerequisite: plant taxonomy.

690 Seminar (UAH and A&MU) 1 hr.
Student reports on current journal articles. Graduate students should attend whether enrolled for credit or not.

691 Special Topics (UAH and A&MU) 1-4 hrs.
Literature search relative to topics of interest under supervision of instructor. For graduate students.

692 Research (UAH and A&MU) 2-4 hrs.
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.

699 Master's Thesis (UAH and A&MU) 1-4 hrs.
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.

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 biology major or minor:

502 Marine Botany 4 hrs.

503 Marine Invertebrate Zoology I 4 hrs.
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.

504 Marine Invertebrate Zoology II 4 hrs.
Study of select marine invertebrate phyla. Origins, relationships, comparative anatomy, embryology, and physiology. Prerequisite: invertebrate zoology.

505 Marine Vertebrate Zoology 4 hrs.
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<tbody>
<tr>
<td>507</td>
<td>Physiology of Marine Animals</td>
<td>4 hrs.</td>
<td>Environmental adaptations of marine animals. Biochemical, osmotic, respiratory, and temperature responses of both invertebrates and fish. Prerequisite: 12 hours in biology. Biochemistry recommended.</td>
</tr>
<tr>
<td>509</td>
<td>Marine Ecology</td>
<td>4 hrs.</td>
<td>Bioenergetics, community structure, population dynamics, predation, competition, and speciation 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 ecological backgrounds. Prerequisites: introductory ecology. Chemistry and physics recommended; marine invertebrate zoology or marine biology helpful.</td>
</tr>
<tr>
<td>510</td>
<td>Marsh Ecology</td>
<td>4 hrs.</td>
<td>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.</td>
</tr>
<tr>
<td>511</td>
<td>Benthic Community Structure</td>
<td>4 hrs.</td>
<td>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.</td>
</tr>
<tr>
<td>515</td>
<td>Coastal Ornithology</td>
<td>4 hrs.</td>
<td>Coastal and pelagic birds with emphasis on ecology, taxonomy, and distribution. Food habits, field identification, and population dynamics. Prerequisite: introductory zoology.</td>
</tr>
<tr>
<td>590</td>
<td>Seminar</td>
<td>1 hr.</td>
<td>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.</td>
</tr>
<tr>
<td>599</td>
<td>Research on Special Topics</td>
<td>1-4 hrs.</td>
<td>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.</td>
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</tbody>
</table>
The following courses cannot be taken for credit toward biology 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.

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<tr>
<td>521</td>
<td>Recent Marine Sedimentation</td>
<td>4 hrs.</td>
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<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>522</td>
<td>Marine Paleocology</td>
<td>4 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
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</tr>
<tr>
<td>601</td>
<td>Oceanology of Gulf of Mexico</td>
<td>4 hrs.</td>
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<tr>
<td></td>
<td>Oceanology of Gulf of Mexico and adjacent waters. Coastal zone, continental shelf, and deep ocean. Prerequisite: graduate standing.</td>
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Chemistry Department

Professors Arendale, Harris, McManus, Riley (chairman); Associate Professors Coble, Emerson; Associate Research Professor Gregory; Adjunct Associate Professor Eley; 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 approved six 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.
Semester Hours
GER (humanities and social sciences) ......................... 30-36
GER (science and mathematics) ............................... 27-28
Chemistry (Requirement No. 2 above) ......................... 21
Total 78-85

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 Biology section.)

Semester Hours
Chemistry electives (300 level or above) ....................... 6
Biology—BY 113, 114, and one elective ......................... 12
Science electives .............................................. 12
Other requirements or electives ............................... 13-20

Curriculum II
Because of recent changes by the State Board of Education in its teacher certification requirements, the department is not able at catalog deadline time to provide a final state approved listing of requirements in various program areas. These requirements will be published by the university as soon as they receive final state approval.

Curriculum III Graduate Preparatory Program
ASC 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.

<table>
<thead>
<tr>
<th>Semester Hours</th>
<th>Chemistry—CH 337, 346, 401, 421, and a senior project</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics—PH 241, 331, 351, one laboratory from 310-312, and one elective</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Mathematics—MA 244, 251, 352, and one elective</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td>6-13</td>
<td></td>
</tr>
</tbody>
</table>

**Curriculum VI**
Typical chemistry-biology 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.

<table>
<thead>
<tr>
<th>Semester Hours</th>
<th>Chemistry—CH 337, 346, 361, 362, 421, and a senior project</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology—BY 113, 114, 221, and two electives</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Mathematics—MA 244</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td>5-12</td>
<td></td>
</tr>
</tbody>
</table>

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 program with the Tuscaloosa campus (see Graduate Programs).

Graduate courses are conducted at a level that assumes 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 Science and Engineering 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 ad-
viser. 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 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 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.
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</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>101</td>
<td>Introduction to Chemistry</td>
</tr>
<tr>
<td>105</td>
<td>Introductory Chemistry Laboratory</td>
</tr>
<tr>
<td>113</td>
<td>Elementary Organic Chemistry</td>
</tr>
</tbody>
</table>

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.

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.

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.
<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>121</td>
<td>General Chemistry</td>
<td>3 hrs.</td>
<td>For science and engineering majors. Principles concerned with gases, liquids,</td>
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<td>solids, and solutions. Nature of the chemical bond, kinetics, chemical</td>
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<td>equilibrium, thermochemistry, chemical properties of elements, their periodic</td>
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<td>groups, and their compounds. Introduction to nuclear chemistry. Prerequisite:</td>
<td>CH 101 or placement test and MA 104 or MA 105 or placement Level II mathematics:</td>
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<td></td>
<td>CH 125.</td>
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</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.</td>
<td>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.</td>
<td>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</td>
<td>Application of chemical and physical properties of numerous metal and complex</td>
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<td>elements.</td>
<td>ions and compounds. 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</td>
<td>Instrumentation. Data treatment, ionic equilibria, elementar</td>
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<td>introduction to instrument.</td>
<td>y electrochemical, spectrochemical, gravimetric, and volumetric techniques.</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</td>
<td>Of carbohydrates lipids, proteins and nucleic acid. Enzymes, coenzymes, vitamins,</td>
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<td>of carbohydrates lipids, proteins and nucleic acid. Enzymes, coenzymes,</td>
<td>blood, endocrine glands, DNA synthesis and gene expression, nutrition, drugs</td>
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<td>vitamins, blood, endocrine glands, DNA synthesis and gene expression,</td>
<td>and biochemistry of specialized tissues. Prerequisites: BY 114 and CH 113 or 123.</td>
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<td>nutrition, drugs and biochemistry of specialized tissues. Prerequisites: BY</td>
<td>No credit given to chemistry majors or minors. Credit in CH 361 precludes</td>
</tr>
<tr>
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<td></td>
<td>114 and CH 113 or 123. No credit given to chemistry majors or minors. Credit</td>
<td>credit in CH 301. (Same as BY 301).</td>
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<td></td>
<td>in CH 361 precludes credit in CH 301. (Same as BY 301).</td>
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</tr>
<tr>
<td>331</td>
<td>Organic Chemistry</td>
<td>3 hrs.</td>
<td>Chemistry of organic compounds. Synthetic methods, theory, and reaction</td>
<td>Prerequisite: CH 123, 126; CH 223 recommended.</td>
</tr>
<tr>
<td>332</td>
<td>Organic Chemistry</td>
<td>2 hrs.</td>
<td>continuation of CH 331. Prerequisite: CH 331.</td>
<td></td>
</tr>
<tr>
<td>333</td>
<td>Organic Chemistry</td>
<td>2 hrs.</td>
<td>Continuation of CH 332. Prerequisite: CH 332.</td>
<td></td>
</tr>
<tr>
<td>335</td>
<td>Organic Chemistry Laboratory I</td>
<td>1 hr.</td>
<td>Techniques of organic chemistry including synthesis, separation, and</td>
<td>Identification of organic compounds with use of chemical and spectroscopic</td>
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<td></td>
<td>identification of organic compounds with use of chemical and spectroscopic</td>
<td>methods. Lab fee: Level 3.</td>
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<td></td>
<td>methods. Lab fee: Level 3.</td>
<td>Prerequisite or parallel: CH 331.</td>
</tr>
<tr>
<td>336</td>
<td>Organic Chemistry Laboratory II</td>
<td>1 hr.</td>
<td>Continuation of CH 335. Lab fee: Level 4. Prerequisite: CH 335. Prerequisite</td>
<td>Pursuit of special open-ended problem by each student. Lab fee: Level 4.</td>
</tr>
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<td></td>
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<td></td>
<td>or parallel: CH 332.</td>
<td>Prerequisite: CH 335. Prerequisite or parallel: CH 332.</td>
</tr>
<tr>
<td>337</td>
<td>Organic Chemistry Laboratory III</td>
<td>2 hrs.</td>
<td>Advanced organic chemistry laboratory treating reactions and techniques not</td>
<td>Covered in CH 335 and 336. Pursuit of special open-ended problem by each student.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>covered in CH 335 and 336. Pursuit of special open-ended problem by each</td>
<td>Lab fee: Level 4. Prerequisite: CH 336 and approval of instructor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>student. Lab fee: Level 4. Prerequisite: CH 336 and approval of instructor.</td>
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</tr>
<tr>
<td>341</td>
<td>Chemical Thermodynamics</td>
<td>3 hrs.</td>
<td>Theory of classical thermodynamics and its application to chemistry of</td>
<td>Pursuit of special open-ended problem by each student. Lab fee: Level 4.</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>solids, liquids, gases, and solutions. Prerequisite: CH 223, PH 113 or 201.</td>
<td>Prerequisite or parallel: MA 233.</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
<td>Description, Prerequisites and Notes</td>
<td></td>
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</tr>
<tr>
<td>342</td>
<td>Chemical Dynamics</td>
<td>2 hrs.</td>
<td>Discuss kinetic theory of gases, theory and formulation of rate equations, mechanisms of chemical reactions, and applications. Prerequisite: CH 341.</td>
<td></td>
</tr>
<tr>
<td>343</td>
<td>Introduction to Quantum Chemistry</td>
<td>2 hrs.</td>
<td>Quantum mechanical treatment of chemical bond. Structure, symmetry, spectroscopy, and statistical thermodynamics. Prerequisite: CH 342, MA 244, or permission of the instructor.</td>
<td></td>
</tr>
<tr>
<td>345</td>
<td>Experimental Physical Chemistry I</td>
<td>1 hr.</td>
<td>Laboratory investigations into thermodynamics. Lab fee: Level 4. Prerequisite: CH 341.</td>
<td></td>
</tr>
<tr>
<td>346</td>
<td>Experimental Physical Chemistry II</td>
<td>1 hr.</td>
<td>Laboratory investigations into kinetics and spectroscopy. Lab fee: Level 4. Prerequisite: CH 345. Parallel: CH 343.</td>
<td></td>
</tr>
<tr>
<td>361</td>
<td>General Biochemistry</td>
<td>3 hrs.</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: BY 114, CH 332, and CH 335. (Same as BY 361).</td>
<td></td>
</tr>
<tr>
<td>362</td>
<td>General Biochemistry Laboratory</td>
<td>1 hr.</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 BY 362).</td>
<td></td>
</tr>
<tr>
<td>401</td>
<td>Inorganic Chemistry</td>
<td>3 hrs.</td>
<td>Fundamental topics in inorganic chemistry. Atomic structure, chemical bonding, periodic relationships, acid-base theories, nonaqueous solvents, and reaction mechanisms. Prerequisite or parallel: CH 342.</td>
<td></td>
</tr>
<tr>
<td>421</td>
<td>Instrumental Analysis</td>
<td>4 hrs.</td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>480</td>
<td>Selected Topics in Chemistry</td>
<td>1-3 hrs.</td>
<td>Special offerings to students in areas of interest not covered in present curriculum. Prerequisite: senior standing and approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>491, 492, 493</td>
<td>Introduction to Chemical Research</td>
<td>1-3 hrs.</td>
<td>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 4 excluding CH 491.</td>
<td></td>
</tr>
<tr>
<td>521</td>
<td>Chemical Instrumentation</td>
<td>4 hrs.</td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>525</td>
<td>Environmental Chemistry</td>
<td>3 hrs.</td>
<td>Principles of quantitative analyses related to minor components of a sample. Applications selected from principal analyses necessary to maintain environmental quality of</td>
<td></td>
</tr>
</tbody>
</table>
air, water, and soil. Selection of conditions for collecting reliable samples, concentra-

tion of components with techniques for increasing concentration of selected compo-
nent, 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 CH 122 or 123; EG 311, 342.

531 Physical Organic Chemistry 3 hrs.
Introduction to theoretical organic chemistry. Bonding, methods for determining reac-
tion 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. Pre-
requisites: CH 337, 342.

549 Spectroscopy and Molecular Structure 3 hrs.
Intermediate level treatment of principles of spectroscopy and their application to deter-
mination of molecular structure. Prerequisite: CH 343.

553 Introductory Quantum Mechanics I 3 hrs.
Prerequisites: CH 343, PH 351, MA 224, 251, 352. (Same as PH 551).

554 Introductory Quantum Mechanics II 3 hrs.
Prerequisite: CH 553. (Same as PH 552).

561 Biochemistry I 3 hrs.
Structural chemistry and function of biomolecules, mechanisms of biochemical reac-
tions, enzyme kinetics, and energy transfer. Prerequisite: CH 333 or CH 361. (Same as
BY 547).

562 Biochemistry II 3 hrs.
Metabolism, biosynthesis of macromolecular precursors, storage, transmission, and ex-
pression of genetic information, and molecular physiology. Prerequisite: CH 561.
(Same as BY 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. Pre-
requisite: 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. Pre-
requisite: 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.

680 Chemistry Seminar 1 hr.
Minimum of two terms required of students working toward M.S. degree.

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.

735 Selected Topics in Organic Chemistry 3 hrs.
Prerequisite: CH 633.

745 Selected Topics in Physical Chemistry 3 hrs.
Prerequisite: CH 643.

765 Selected Topics in Biochemistry 3 hrs.
Prerequisite: CH 661.

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 (non-science) majors. Contemporary aspects of science are a framework for introducing basic scientific concepts in a manner more appropriate for non-science 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 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
Professor deMaine; Associate Professors Hooper, Hsia, Johannes (chairman), Shiva; Adjunct Associate Professors Hay, Vick; Adjunct Assistant Professor Hodges; Instructor Graves.

Undergraduate Programs
Courses in computer science are offered to satisfy the requirements of a minor or cognate studies in the undergraduate program and to satisfy approved specializations in the graduate program.

The following list is typical of a cluster of courses chosen by students:

Undergraduate Minor
Minor
Business majors with a computer science minor — CS 113, 208, 214, 308, 311, 411, and one of the following: CS 513, 517, 524, or 530.
Mathematics and science majors with a computer science minor — CS 113, 208, 214, 308, 309, 415, and one of the following: CS 517, 520, 524, or 530.

Cognate Study
CS 100, 211, 310, 411

Graduate Minor
CS 511 and one of the following options:
a. CS 513 or 690
b. CS 513, 517, 520, 524, 530, 612 or 690
c. CS 603, 703
d. CS 517, 524, 603, 612

Graduate Program
The computer science faculty offers programs of study leading to the Master of Science degree under Plan I and Plan II and the Doctor of Philosophy degree. General information about the graduate program at UAH and general requirements for advanced degrees are given in the section on Graduate Studies. The Computer Science Department offers courses in the following areas: (1) Foundations of Computer Science, (2) Software Systems, (3) Artificial Intelligence, and (4) Computer Architecture.

The M.S. degree program is primarily for graduate students with undergraduate degrees in areas other than computer science. Its purpose 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 (1) mathematics, MA 153, MA 154, MA 233, and MA 244 and three hours of logic abstract algebra (CS 214, MA 440, or equivalent) and (2) working knowledge of a high-level programming language (CS 113 or equivalent) and an assembly programming language (CS 308 or CS 511 or equivalent). Students who do not meet requirements may be admitted on recommendation of the Computer Science Department chairman.
A minimum score of 500 on the quantitative portion of the aptitude test of GRE is required for unconditional admission. The advanced portion of GRE is not required.

Degree Requirements — The Master of Science degree is conferred on students who satisfy degree requirements of Graduate School under Plan I or Plan II and the following:

1. Courses numbered between 500 and 599 may be taken for graduate credit with prior approval of student’s plan of study. A student required to take CS 511 as a prerequisite may not count it toward minimum degree requirements. 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. Courses are selected by student with the counsel of his adviser and are subject to approval by the chairman of the Computer Science Department, dean of the School of Science and Engineering, and dean of the School of Graduate Studies.

Additional course work may be required to remove deficiencies in undergraduate studies (e.g., to acquire a working knowledge of a computer language).

A particular program 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.

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 (30 for students with three or more terms of full-time work) 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.

Other Courses Counted toward Computer Science Major:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EG 506</td>
<td>Communication Theory</td>
</tr>
<tr>
<td>MA 515</td>
<td>Numerical Methods in Analysis</td>
</tr>
<tr>
<td>EG 527</td>
<td>Systems Simulation</td>
</tr>
<tr>
<td>EG 602</td>
<td>Digital Computer Design</td>
</tr>
<tr>
<td>EG 707</td>
<td>Information Theory</td>
</tr>
<tr>
<td>EG 621</td>
<td>Statistical Methods for Engineers</td>
</tr>
<tr>
<td>EG 631</td>
<td>Management Information Systems</td>
</tr>
<tr>
<td>EG 702</td>
<td>Theory of Automata</td>
</tr>
</tbody>
</table>

Approved Minor Areas
- Administrative science (AS 621, 622, 623, 624, 626)
- Computer engineering
Control sciences (EG 505, 605, 619, 700, 704, 705)
Ergonomics (EG 524, 624, 626)
Management applications (EG 620, 622, 631)
Mathematics (515, 544, 614, 615)
Operations research (EG 626, 624, 636)
Statistics with application (544, 585, 653, 656, 685, ST 687)
Other appropriate minors may be approved by chairman of Computer Science Department.

Doctor of Philosophy
A statement of procedures for admission 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 on 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 in graduate computer science must be selected with the approval of the advisory committee to form a cohesive major. At least 9 of the 15 semester hours must be selected from a single area and at least 6 semester hours must be at the 700 level.

Minor Subjects
The candidate must also have a minor consisting of 24 semester hours outside of one of the 4 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: (1) Completion of at least 18 semester hours of graduate course work in residence at UAH, (2) 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 Basic Computers and Computing
3 hrs.
History of computation and computer revolution. Overall structure of computer problem solving and method of constructing of computer solutions. Impact of computers on
the individual and society. Applications of computers in business, medicine, and humanities. Lab fee: Level 3.

113 Introduction to Computing 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. Prerequisite: MA 121 or Level III mathematics placement.

208 Computer Organization and Software Systems I 3 hrs.
Computer hardware organization; representative of numbers and characters, memory, and memory-addressing techniques. Functions of central processing and control units, instruction representation and execution. Computer software systems; loaders, assemblers, programming concepts including subroutines, recursive and re-entrant code, and macros. Organization of university's computer and its assembly language and programming experience in an assembly language. Laboratory included. 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. Design and implementation of computer-based information systems. Lab fee: Level 3. Prerequisite: CS 100 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. Prerequisites: CS 113 and either MA 121 or Level III mathematics placement.

308 Computer Organization and Software Systems II 3 hrs.

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. Prerequisite: junior standing and CS 113 or EG 196. Lab fee: Level 3.

310 Introduction to Business Data Processing 3 hrs.
Overview of COBOL, advanced COBOL features, RPG, and control language and associated file handling (random and indexed sequential). Table-handling and hierarchical data structures; management of computers, documentation, and maintenance. Lab fee: Level 3. Prerequisite: CS 211 or CS 308.

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 308.
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.

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. 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 of illustrating typical usage and characteristics. Lab fee: Level 3. Prerequisite: CS 311 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 4. Prerequisite: CS 424 or permission of instructor.

511 Assembly Language Programming* 3 hrs.
Assembly language programming in fixed wordlength computers, techniques in addressing and machine control, data structures and data-processing. Use of subroutine linkages, coroutines, pushdown lists, list processing, recursions and input-output subroutines. Use of a macroassembly language. Organization and architecture of university's computer and its assembly language. Not open to students who have taken CS 208. Lab fee: Level 4. Prerequisite: CS 113 or EG 196.

*If the course taught used a computer system other than system currently used on the university's campus, students completing this course must acquire proficiency in using university's computer before taking any other CS course that requires CS 511 as prerequisite.

513 Computer Architecture 3 hrs.
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. Prerequisite: CS 308 or 511 and CS 309; not open to students who have had CS 415, or equivalent.

517 Data Structures 3 hrs.
Basic concept of data. Linear lists, sublists, strings, arrays, trees, queues, and stacks. 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 4. Prerequisite: CS 308 or CS 511 or approval of instructor.

520 Computer Related Mathematics 3 hrs.
Classification of numerical errors, propagation of errors, algorithms for computing roots of polynomials with error analysis. Propositional logic, graph theory, predicate calculus, and their relationship to program analysis. Regular expressions and application to various areas of computer science. Lab fee: Level 4. Prerequisites: CS 214 or equivalent and at least one mathematics course at the 200 level or above.

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 4. Prerequisite: CS 517 or approval of instructor.

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 4. Prerequisite: CS 214 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 simple expression and statements; organization of a compiler including compile-time and run-time symbol tables, lexical scan, syntax scan, object-code generation and error diagnostics. Extensive use of compiler writing system in classroom projects to construct compilers for programming languages. Lab fee: Level 4. Prerequisite: CS 517 and 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. 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 4. Prerequisite: CS 517.

624 **Programming Languages** 3 hrs.
Definition and classification of programming languages. Concepts, designs, and use of languages, such as block-structures, 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, symantics, and pragmatics. Lab fee: Level 4. Prerequisite: CS 517 or equivalent.

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 4. Prerequisite: CS 624.

685 **Microprocessors** 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 4. Prerequisites: CS 511 or equivalent and CS 415 or CS 513.

687 **Data Base Systems** 3 hrs.

680-684 **Selected Topics in Computer Science** 3 hrs.
Courses in special topics requested by students. Prerequisite: approval of instructor.
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 4. Prerequisite: CS 517.

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. 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 CS 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 4. Prerequisites: CS 530 and CS 624.

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 4. Prerequisite: CS 650.

780-785 Advanced Selected Topics 3 hrs.
Advanced special topics requested by students. Prerequisite: approval of instructor.
Engineering Departments and Programs

Civil Engineering
Professor Rand; Associate Professor Payne

Electrical Engineering
Professors Audeh, Dowdle, Halijak, Johnson, Polge (acting chairman); Associate Professors Kheir, Thurstone; Adjunct Associate Professor O’Reilly; Assistant Professors Bradley, Ho, Marr.

Industrial and Systems Engineering
Professors Black, Brown, Shannon, Wyskida; Adjunct Professor Bucher; Adjunct Associate Professor Lowe; Assistant Professor Fortenberry

Mechanical Engineering
Professors Chung (chairman), Hung, Liu, Shih, Wu; Professors Emeriti Hermann, Kubitza; Associate Professors Brainerd, Karr, Thompson, Wallace; Adjunct Associate Professors Guinn, Head

Degrees and Programs
The School of Science and Engineering offers programs leading to the degrees of Bachelor of Science in Engineering, Master of Science in Engineering, Master of Science in Operations Research, and Doctor of Philosophy.

When desirable, as evidenced from continuous studies, the School of Science and 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>Course</th>
<th>Middle Digit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Engineering</td>
<td>0-1</td>
</tr>
<tr>
<td>Industrial and Systems Engineering</td>
<td>2-3</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>4</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>4-7</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>7</td>
</tr>
<tr>
<td>General Engineering</td>
<td>8-9</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
The School of Science and 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 engineering, industrial and systems engineering, and mechanical engineering. The electrical 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.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EH 003</td>
<td>Remedial Writing</td>
<td>No credit</td>
</tr>
<tr>
<td>CH 101</td>
<td>General Chemistry</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>CH 105</td>
<td>General Chemistry Laboratory</td>
<td>1 hr.</td>
</tr>
<tr>
<td>MA 119</td>
<td>Precalculus I</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>MA 121</td>
<td>Precalculus II</td>
<td>3 hrs.</td>
</tr>
</tbody>
</table>

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 Science and 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:

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Engineering core (25 hours):</td>
</tr>
<tr>
<td>FORTRAN Programming - EG 197</td>
</tr>
<tr>
<td>Statics - EG 271</td>
</tr>
<tr>
<td>Nature and Properties of Materials and Lab - EG 294 and 295</td>
</tr>
</tbody>
</table>
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 HBS 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.
   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. The
transport phenomena (heat and mass transfer and fluid mechanics), thermodynamics,
and chemical reaction kinetics constitute the heart of chemical engineering science.
Typical fields of application are chemical, petrochemical,
and petroleum-products production, energy-resources development, and
pollution control.

<table>
<thead>
<tr>
<th>Additional Basic Sciences</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry - CH 123, 126, 331, 332, 335, 342, 345</td>
<td>13</td>
</tr>
</tbody>
</table>

**Chemical Engineering Option**

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EG 198</td>
<td>Engineering Graphics</td>
<td>2</td>
</tr>
<tr>
<td>EG 243</td>
<td>Chemical Process Calculations I</td>
<td>2</td>
</tr>
<tr>
<td>EG 341</td>
<td>Thermodynamics I</td>
<td>3</td>
</tr>
<tr>
<td>EG 342</td>
<td>Thermodynamics II</td>
<td>3</td>
</tr>
<tr>
<td>EG 343</td>
<td>Chemical Process Calculations II</td>
<td>2</td>
</tr>
<tr>
<td>EG 352</td>
<td>Fluid Mechanics</td>
<td>2</td>
</tr>
<tr>
<td>EG 353</td>
<td>Fluid Mechanics Lab</td>
<td>1</td>
</tr>
</tbody>
</table>
**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 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 .......................................... 8

Total ......................................................... 133

* Choose from EG 375, 376, 478, 549, 554, 561, 571, 572, 596 or from upper-level courses approved by the Civil Engineering program chairman.

**Electrical Engineering Option.** The electrical engineering option offers a background that enables a student to pursue careers in any of the many and
diverse facets of electrical 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

Additional Basic Sciences
General Physics with Calculus III - PH 113 .................................. 2

Electrical Engineering Option
EG 202 - Introduction to Logic Design ........................................ 3
EG 220 - Production and Operation Systems I ................................. 3
EG 310 - Solid State Fundamentals ........................................ 2
EG 303 and 313 - Electrical Circuits II and Lab .......................... 4
EG 305 and 315 - Electronics I and Lab .................................. 4
EG 307 - Electricity and Magnetism ........................................ 3
EG 341 - Thermodynamics I .................................................. 3
EG 381 - Operational Methods in Engineering ............................ 2
EG 390 - Probability and Engineering Statistics I ....................... 3
EG 396 - Numerical Methods and Computations ........................ 2
EG 487 - Analysis and Control of Dynamical Processes ............... 2
Electrical Engineering Electives* ........................................ 14
Choose one course from: EG 352/353, 370, 488 .................................. 3
* Technical Electives .................................................. 3

Total 129

* 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 Engineering.

Industrial and Systems Engineering Option. Industrial and systems engineering is concerned primarily with integration of hardware 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.

Semester Hours

Additional Basic Sciences
Science Elective ................................................................. 4

Industrial Engineering Option
EG 198 - Engineering Graphics .............................................. 2
EG 220 - Production and Operation Systems I ............................... 3
EG 320 - Production and Operation Systems II ......................... 3
EG 370 - Mechanics of Materials .......................................... 3
EG 379 - Mechanics of Materials Lab .................................. 1
EG 390 - Probability and Engineering Statistics I ..................... 3
EG 421 - Probability and Engineering Statistics II .................. 3
EG 427 - Management Systems Analysis .................................. 3
EG 428 - Systems Analysis and Design I .................................. 2
EG 429 - Systems Analysis and Design II .................................. 2
EG 487 - Analysis and Control of Dynamical Processes ............... 2
EG 524 - Introduction to Ergonomics: Work Development ........... 3
AC 211 - Accounting I ........................................... 3
Industrial Engineering Electives ................................... 9
* Technical Electives ............................................. 7

Total 129

* Choose from EG 202, 303/313, 305/315, 341, 352/353, 381, 396, 488, 501, or other upper-level courses approved by the Department of Industrial and Systems Engineering.

**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.

Semester Hours

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 ..................................... 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 442 - Introduction to Heath and Mass Transfer ............... 4
EG 446 - Analysis and Design of Energy Systems ................. 3
EG 466 - Mechanics and Design of Machine Elements ............ 3
EG 488 - Analysis of Engineering Systems ........................ 3
EG 465 - Engineering Design ........................................ 3
EG 554 - Advanced Fluid Mechanics ................................ 3
* Technical Electives ............................................. 10

Total 133

* Choose from EG 220, 307, 381, 390, 487 or 505, 543, 544, 550, 596, or other upper-level courses approved by the Department of Mechanical Engineering.

**B.S.E. Curriculum.** Because the Engineering curriculum is highly structured, it is important that the student consult with his faculty adviser regularly (at least twice each year) in order to plan his program of study.
### Suggested First Two-Years Schedule of Courses for Full-time Civil, Industrial and Systems, and Mechanical Engineering Students

<table>
<thead>
<tr>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>EH 101</td>
<td>EH 102</td>
<td>*Hu-SS</td>
</tr>
<tr>
<td>MA 153</td>
<td>MA 154</td>
<td>MA 233</td>
</tr>
<tr>
<td>CH 121 and 125</td>
<td>CH 123 and 126</td>
<td>CH 331 and 335</td>
</tr>
<tr>
<td>EG 198 (except EE)</td>
<td>EG 197</td>
<td>EG 172 (CE)</td>
</tr>
<tr>
<td>10-12 hrs.</td>
<td>13 hrs.</td>
<td>10-12 hrs.</td>
</tr>
<tr>
<td>Hu-SS</td>
<td>Hu-SS</td>
<td>HBS 392</td>
</tr>
<tr>
<td>MA 251</td>
<td>MA 244</td>
<td>MA 352</td>
</tr>
<tr>
<td>EG 294</td>
<td>EC 142</td>
<td>EG 321</td>
</tr>
<tr>
<td>EG 295</td>
<td>EG 271</td>
<td>EG 362</td>
</tr>
<tr>
<td>EG 173 (CE)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>PH 113 (EE)</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

### Suggested First Two-Years 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>EH 102</td>
<td>Hu-SS</td>
</tr>
<tr>
<td>MA 153</td>
<td>MA 154</td>
<td>MA 233</td>
</tr>
<tr>
<td>CH 121</td>
<td>CH 123 and 126</td>
<td>CH 331 and 335</td>
</tr>
<tr>
<td>EG 198</td>
<td>MA 244</td>
<td>MA 352</td>
</tr>
<tr>
<td>12 hrs.</td>
<td>10 hrs.</td>
<td>13 hrs.</td>
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<tr>
<td>Hu-SS</td>
<td>Hu-SS</td>
<td>HBS 392</td>
</tr>
<tr>
<td>MA 251</td>
<td>MA 244</td>
<td>MA 352</td>
</tr>
<tr>
<td>PH 111</td>
<td>PH 112</td>
<td>EG 243</td>
</tr>
<tr>
<td>CH 332</td>
<td>EG 142</td>
<td>EG 294 and 295</td>
</tr>
<tr>
<td>12 hrs.</td>
<td>13 hrs.</td>
<td>12 hrs.</td>
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</tbody>
</table>

### Suggested Schedule of Courses for Full-time Electrical Engineering Students

<table>
<thead>
<tr>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>EH 101</td>
<td>EH 102</td>
<td>EG 197</td>
</tr>
<tr>
<td>MA 153</td>
<td>MA 154</td>
<td>MA 233</td>
</tr>
<tr>
<td>CH 121</td>
<td>PH 111</td>
<td>MA 352</td>
</tr>
<tr>
<td>CH 125</td>
<td>1</td>
<td>PH 112</td>
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<td>10 hrs.</td>
<td>10 hrs.</td>
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<tr>
<td>MA 244</td>
<td>MA 251</td>
<td>EG 294</td>
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<tr>
<td>PH 113</td>
<td>EG 310</td>
<td>EG 295</td>
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<tr>
<td>EG 202</td>
<td>EG 220</td>
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<tr>
<td>EC 142</td>
<td>*Hu-SS</td>
<td>1</td>
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<tr>
<td>11 hrs.</td>
<td>11 hrs.</td>
<td>10 hrs.</td>
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<tr>
<td>EG 300</td>
<td>EG 311</td>
<td>EG 315</td>
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<tr>
<td>EG 321</td>
<td>EG 301</td>
<td>EG 305</td>
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<tr>
<td>EG 362</td>
<td>EG 381</td>
<td>EG 313</td>
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<tr>
<td>EG 396</td>
<td>EG 307</td>
<td>EG 303</td>
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<tr>
<td>11 hrs.</td>
<td>11 hrs.</td>
<td>3</td>
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<tr>
<td>EG 487</td>
<td>ME</td>
<td>EG 390</td>
</tr>
<tr>
<td>Hu-SS</td>
<td>HBS 392</td>
<td>11 hrs.</td>
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<tr>
<td>EE</td>
<td>EE</td>
<td>11 hrs.</td>
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<tr>
<td>EE</td>
<td>EG 493</td>
<td>10 hrs.</td>
</tr>
<tr>
<td>EE Lab</td>
<td>1</td>
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<tr>
<td>12 hrs.</td>
<td>11 hrs.</td>
<td>10 hrs.</td>
</tr>
</tbody>
</table>

*Hu-SS - 9 hours in humanities / social sciences
Graduate Engineering Programs

The School of Science and 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 (2.0 out of a possible 3.0) 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 probationally 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 Science and 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 Science and 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 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) 6 hours of courses (600 or above) in the primary engineering discipline, (b) 6 hours of courses in a second approved engineering area of specialization, physics, chemistry, or biology, (c) 6 hours of approved electives, chosen in support of primary area of specialization, (d) 6 hours in mathematics courses with MA or ST prefix at 500 level or above. With approval of the student's adviser, substitutions for these 6 hours may be selected from EG 621, EG 693, EG 721 if such EG courses are not counted in requirement (b) above.

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 basic program of study, (c) 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.

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 re-
quired 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.

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 nonengineering undergraduate degrees. 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.

Admission to the Program

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.

Program of Study

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 525, 625, 629, (b) 6 hours of courses in approved minor area, (c) 6 hours in mathematics, 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.

Requirements for the Ph.D. Degree

The degree of Doctor of Philosophy offered in the School of Science and 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 Science and Engineering and 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
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 2. Prerequisite: EG 198 or consent of instructor.

173 Surveying II
History and methods of surveying public lands of the United States. Problems in resurveys of public lands. Topographic surveying project. Laboratory work included. Lab fee: Level 2. Prerequisite: EG 172.

181 Energy and Man
Technical and social aspects of energy, history and projection of energy use in the U.S., world energy natural resources. Present and future technologies in generation, transmission, and storage, new forms of energy conservation, future challenges. Introduction to engineering approach. Weekly laboratory demonstration or field trips. Prerequisites: MA 121 or Level II placement and one science course. (No credit to engineering juniors or seniors.)
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
<th>Prerequisite(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>197</td>
<td>Computer Methods in Engineering</td>
<td>3 hrs.</td>
<td>Solution of engineering problems using a digital computer. Hardware structure of the stored-program computer; matching language programming; engineering approximation of dynamic systems; flowcharting and algorithms. Practice in solving engineering problems on the university computer using FORTRAN. Lab fee: Level 3. Prerequisite: MA 121.</td>
<td></td>
</tr>
<tr>
<td>202</td>
<td>Introduction to Digital Logic Design</td>
<td>3 hrs.</td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>220</td>
<td>Production and Operation Systems I</td>
<td>3 hrs.</td>
<td>Quantitative methods used in planning, analysis, design, and control of production systems. Lab fee: Level 1. Prerequisites: MA 154, EG 197.</td>
<td></td>
</tr>
<tr>
<td>243</td>
<td>Chemical Process Calculations I</td>
<td>2 hrs.</td>
<td>Orientation to chemical engineering calculations. Calculation of material balances on chemical and petrochemical processes and related calculations. Prerequisite: CH 123.</td>
<td></td>
</tr>
<tr>
<td>271</td>
<td>Statics</td>
<td>3 hrs.</td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>294</td>
<td>Nature and Properties of Materials</td>
<td>3 hrs.</td>
<td>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 or parallel: CH 121, PH 112 must parallel EG 295.</td>
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</tr>
<tr>
<td>295</td>
<td>Nature and Properties of Materials Laboratory</td>
<td>1 hr.</td>
<td>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 3.</td>
<td></td>
</tr>
<tr>
<td>300</td>
<td>Electrical Circuits I</td>
<td>3 hrs.</td>
<td>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.</td>
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<tr>
<td>301</td>
<td>Electronic Instrumentation Laboratory</td>
<td>1 hr.</td>
<td>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.</td>
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<tr>
<td>303</td>
<td>Electrical Engineering Laboratory</td>
<td>1 hr.</td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>305</td>
<td>Electronics Laboratory I</td>
<td>1 hr.</td>
<td>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.</td>
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<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
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<tr>
<td>307</td>
<td>Electricity and Magnetism</td>
<td>3 hrs.</td>
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<tr>
<td>311</td>
<td>Electronic Instrumentation</td>
<td>3 hrs.</td>
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<tr>
<td>313</td>
<td>Electrical Circuits II</td>
<td>3 hrs.</td>
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<tr>
<td>315</td>
<td>Electronics I</td>
<td>3 hrs.</td>
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<tr>
<td>320</td>
<td>Production and Operation Systems II</td>
<td>3 hrs.</td>
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<td>321</td>
<td>Engineering Economy</td>
<td>3 hrs.</td>
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<tr>
<td>341</td>
<td>Thermodynamics I</td>
<td>3 hrs.</td>
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<tr>
<td>342</td>
<td>Thermodynamics II</td>
<td>3 hrs.</td>
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<tr>
<td>343</td>
<td>Chemical Process Calculations II</td>
<td>2 hrs.</td>
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<tr>
<td>352</td>
<td>Fluid Mechanics</td>
<td>2 hrs.</td>
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<tr>
<td>353</td>
<td>Fluid Mechanics Lab</td>
<td>1 hr.</td>
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</table>
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 2. Prerequisites: EG 352, 370.

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. Prerequisite: EG 371.

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 2. 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-carbon alloys, aluminum alloys, brass, and plastics. Experimental verification of theories treated in EG 370. Use of strain measuring devices; test procedures, instrumentation, and interpretation of results. Preparation of reports. Lab fee: Level 2. Prerequisite: must parallel with EG 370.
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 313, 315.

421 Probability and Engineering Statistics II 3 hrs.
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.

422 Systems Analysis 2 hrs.
Philosophy and methods of industrial and nonindustrial systems analysis. Methods of systems definition, analysis, simplification, methods of provision of control and information feedback, and methods of systems evaluation. Group design project required. Prerequisite: EG 390 and senior standing.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>427</td>
<td>Management Systems Analysis</td>
<td>3 hrs.</td>
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<tr>
<td></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. Prerequisites: EG 220, 390.</td>
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</tr>
<tr>
<td>428</td>
<td>Systems Analysis and Design I</td>
<td>2 hrs.</td>
</tr>
<tr>
<td></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>
<td></td>
</tr>
<tr>
<td>429</td>
<td>Systems Analysis and Design II</td>
<td>2 hrs.</td>
</tr>
<tr>
<td></td>
<td>Continuation of design project begun in EG 428. Prerequisite: EG 428.</td>
<td></td>
</tr>
<tr>
<td>441</td>
<td>Chemical Engineering Lab</td>
<td>1 hr.</td>
</tr>
<tr>
<td></td>
<td>Experiments studies including free and forced-convection heat transfer, radiative heat transfer, measurement of gas diffusivities, concentration gradients, mass transfer coefficients, and plate efficiencies. Lab fee: Level 2. Prerequisites: EG 443, 444 (or parallel).</td>
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</tr>
<tr>
<td>442</td>
<td>Introduction to Heat and Mass Transfer</td>
<td>4 hrs.</td>
</tr>
<tr>
<td></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 3. Prerequisites: EG 341, 352, 396, MA 352.</td>
<td></td>
</tr>
<tr>
<td>443</td>
<td>Mass Transfer Operation I</td>
<td>3 hrs.</td>
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<td></td>
<td>Mass transfer within stage-type equipment. Distillation, gas absorption/desorption, leaching of solids, and liquid-liquid extraction. Prerequisite: EG 343; EG 342 recommended.</td>
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</tr>
<tr>
<td>444</td>
<td>Mass Transfer Operation II</td>
<td>3 hrs.</td>
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<tr>
<td>446</td>
<td>Analysis and Design of Energy Systems</td>
<td>3 hrs.</td>
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<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. Prerequisite: EG 442.</td>
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</tr>
<tr>
<td>465</td>
<td>Engineering Design</td>
<td>2 hrs.</td>
</tr>
<tr>
<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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<tr>
<td>466</td>
<td>Mechanics and Design of Machine Elements</td>
<td>3 hrs.</td>
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<td></td>
<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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</tr>
<tr>
<td>471</td>
<td>Structural Analysis II</td>
<td>3 hrs.</td>
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<tr>
<td>472</td>
<td>Hydraulic Engineering</td>
<td>3 hrs.</td>
</tr>
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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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</tr>
<tr>
<td>473</td>
<td>Transportation Engineering and Design</td>
<td>3 hrs.</td>
</tr>
<tr>
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<td>Theory, design, and operation of various modes of transportation. Prerequisites: EG 173, 372.</td>
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</tbody>
</table>
475 Hydrology 2 hrs.
Hydrologic cycles, rainfall and runoff analysis, hydrograph analysis, water-shed studies, overland flow and flood routing, sediment transport, hydrologic forecast. Prerequisite: EG 352.

476 Sanitary Engineering 3 hrs.
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.

477 Civil Engineering Project I 1 hr.
Individualized design project under supervision of instructor. Prerequisite: senior standing.

478 Civil Engineering Project II 3 hrs.
Analysis and design of complete civil engineering project including establishment of design criteria, cost estimates, specifications, and plans. Prerequisite: EG 477.

487 Analysis and Control of Dynamical Processes 2 hrs.
Dynamical processes found in engineering, 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.

488 Analysis of Engineering Systems 3 hrs.
Mathematical modeling of physical systems and determining their dynamic response. Mechanical, electrical, electromechanical, heat transfer, fluid-mechanical, and other engineering problems. Prerequisite: senior standing.

493 Introduction to Engineering Design 2 hrs.
Application of basic design principles and concepts. Design methodology, decision making, creativity, product liability, human factors, patents, and others. Team design projects. Prerequisite: senior standing.

496 Selected Topics in Engineering Credit to be arranged

501 Electric Machines 3 hrs.
Direct and alternating current machines equivalent circuits and models, efficiency, input requirements and output characteristics, applications; graphical and mathematical aspects of electrical machines. Prerequisite: EC 313.

502 Advanced Logic Circuits 3 hrs.
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 3 hrs.
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 3 hrs.
Measurement techniques and conventional and electronic instruments. Construction, theory of operation, and proper use of bridge circuits, oscilloscopes transducers, and digital instruments. Prerequisite: EG 311.

505 Automatic Control Theory 3 hrs.
Theory common to all feedback control systems. Transfer functions, stability criteria, and frequency response. Prerequisite: EG 381.
**506 Communication Theory**
3 hrs.
Transmission of information including effects of networks, modulation systems, noise, and use of statistics in analysis of information transmission. Prerequisite: EG 381.

**509 Microcomputers**
3 hrs.
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**
Credit to be arranged

**516 Digital Electronics**
3 hrs.
Nonsinusoidal generating and wave-shaping circuits, timing circuits, limiters, comparators, clamps, logic gates, multivibrators, and voltage-controlled oscillators. Prerequisites: EG 202 and 315.

**519 Digital Electronics Laboratory**
1 hr.
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 3. Must parallel EG 516.

**522 Logistics Planning and Control**
3 hrs.
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 or MN 502.

**523 Statistical Quality Control**
3 hrs.
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 2. 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 4. Prerequisites: EG 196 or CS 113; EG 390, 621 or MA 585.

**539 Selected Topics in Industrial Engineering**
1-3 hrs.

**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.

**543 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 342, 352, 442.
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 Air Distribution System Design 3 hrs.
Design of air distribution system used in heating and air-conditioning systems. Fluid flow, duct design, fan design, pumps, piping design, room air distribution, and building air distribution. Prerequisite: EG 544.

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.
Fundamental equation of fluid mechanics with applications to two- and three-dimensional flows. Stream functions, vorticity, potential functions, and viscous flow. Prerequisite: EG 352.

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 3 hrs.
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

596 Numerical Engineering Analysis 3 hrs.
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.

601 Linear Systems 3 hrs.
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 3 hrs.

603 Computer Methods in Power Systems 3 hrs.
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.

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 3 hrs.

608 Electromagnetic Field Theory I 3 hrs.

609 Electromagnetic Field Theory II 3 hrs.
Continuation of EG 608. Prerequisite: EG 608.

610 Selected Topics in Electrical Engineering Credit to be arranged

614 Linear Graphs and Electrical Networks 3 hrs.

615 Active Networks Synthesis 3 hrs.
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 Integrated Circuits 3 hrs.
Treatment of four basic aspects of integrated circuit engineering: fabrication, device behavior, linear circuits, and digital circuits. Theory of MOS devices and circuits. Prerequisite: graduate standing.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>620</td>
<td>Engineering Management I</td>
<td>3 hrs.</td>
<td>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.</td>
</tr>
<tr>
<td>621</td>
<td>Statistical Methods of Engineers</td>
<td>3 hrs.</td>
<td>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. Not open to students majoring in industrial and systems engineering (except engineering management) or the MSOR program. Prerequisite: MA 251 and graduate standing.</td>
</tr>
<tr>
<td>622</td>
<td>Research and Development Management</td>
<td>3 hrs.</td>
<td>Problems unique to the management of organizations engaged in R&amp;D activities. Management control systems for R&amp;D projects, motivation of technical personnel, problems of managing the creative person, means of increasing creativity, and management of change. Prerequisite: EG 620.</td>
</tr>
<tr>
<td>626</td>
<td>Introduction to Operations Research</td>
<td>3 hrs.</td>
<td>Philosophy and methodology of operations research. Lab fee: Level 1. Prerequisite: EG 197 or CS 113.</td>
</tr>
<tr>
<td>627</td>
<td>Introduction to Systems Engineering</td>
<td>3 hrs.</td>
<td>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.</td>
</tr>
<tr>
<td>628</td>
<td>Engineering Management II</td>
<td>3 hrs.</td>
<td>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.</td>
</tr>
<tr>
<td>631</td>
<td>Management Information Systems</td>
<td>3 hrs.</td>
<td>Introduction to 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.</td>
</tr>
<tr>
<td>632</td>
<td>Stochastic Systems</td>
<td>3 hrs.</td>
<td>Processes whose outputs are governed by probabilistic laws. Gaussian processes, processes with correlated and uncorrelated variables, and Markov processes. Prerequisite: EG 421 or 621.</td>
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<tr>
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<tr>
<td>633</td>
<td>Industrial Forecasting and Analysis I</td>
<td>3 hrs.</td>
<td>Industrial forecasting methods. Simple forecasting models, multivariate regression, correlation, and spectral analysis, exponential smoothing, and Box-Jenkins forecasting. Lab fee: Level 4. Prerequisite: EG 421 or EG 621.</td>
</tr>
<tr>
<td>634</td>
<td>Value and Decision Theory</td>
<td>3 hrs.</td>
<td>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.</td>
</tr>
<tr>
<td>635</td>
<td>Linear Programming</td>
<td>3 hrs.</td>
<td>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.</td>
</tr>
<tr>
<td>636</td>
<td>Systems Modeling</td>
<td>3 hrs.</td>
<td>Philosophy and methodology for modeling probabilistic systems. Team project required. Lab fee: Level 1. Prerequisites: EG 390 or 621, EG 626 or 627.</td>
</tr>
<tr>
<td>638</td>
<td>Engineering Reliability</td>
<td>3 hrs.</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>
</tr>
<tr>
<td>639</td>
<td>Selected Topics in Industrial and Systems Engineering</td>
<td>Credit to be arranged</td>
<td></td>
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<tr>
<td>642</td>
<td>Internal Combustion Engines</td>
<td>4 hrs.</td>
<td>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, 352, 442.</td>
</tr>
<tr>
<td>643</td>
<td>Energy Conversion and Power Generation II</td>
<td>3 hrs.</td>
<td>Continuation of EG 543 with applications to nuclear and nonconventional power plants. Nuclear energy supplies, preparation of fuel, nuclear reactor and steam generator design, safety considerations and waste disposal. Fuel cells, geothermal energy utilization, availability of solar energy and feasible applications, projections for all-electric and hydrogen economy. Prerequisite: EG 543.</td>
</tr>
<tr>
<td>645</td>
<td>Propulsion</td>
<td>3 hrs.</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>
</tr>
<tr>
<td>649</td>
<td>Transport Phenomena</td>
<td>3 hrs.</td>
<td>Mass, energy, and momentum transport in steady and transient motions in real and theological substances. Prerequisite: EG 442.</td>
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<tr>
<td>Course Code</td>
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<tr>
<td>652</td>
<td>Introduction to Air Pollution Control</td>
<td>3 hrs.</td>
<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>
</tr>
<tr>
<td>653</td>
<td>Gasdynamics</td>
<td>3 hrs.</td>
<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>
</tr>
<tr>
<td>654</td>
<td>High Speed Flow Theory</td>
<td>3 hrs.</td>
<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>
</tr>
<tr>
<td>655</td>
<td>Fluid Dynamics</td>
<td>3 hrs.</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>
</tr>
<tr>
<td>656</td>
<td>Viscous Flow and Convective Heat Transfer I</td>
<td>3 hrs.</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>
</tr>
<tr>
<td>659</td>
<td>Selected Topics in Mechanical Engineering</td>
<td>Credit to be arranged</td>
<td></td>
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<tr>
<td>661</td>
<td>Advanced Dynamics</td>
<td>3 hrs.</td>
<td>Variational methods, optimization, and dynamic stability. Lagrangian and Hamiltonian formulation for dynamical systems and Hamilton-Jacobi theory. Prerequisite: EG 563.</td>
</tr>
<tr>
<td>663</td>
<td>Astrodynamics</td>
<td>3 hrs.</td>
<td>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.</td>
</tr>
<tr>
<td>671</td>
<td>Continuum Mechanics</td>
<td>3 hrs.</td>
<td>Kinematics and kinetics, various coordinate systems, constitutive equations for continuous media; applications to boundary value and initial value problems. Prerequisites: EG 352, 370.</td>
</tr>
<tr>
<td>674</td>
<td>Finite Element Analysis I</td>
<td>3 hrs.</td>
<td>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.</td>
</tr>
</tbody>
</table>
676 Inelastic Behavior of Materials and Structures
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
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.

683 Graduate Seminar in Mechanical Engineering
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
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
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 equa-
tions, Z-transform theory, digital-filter design, fast Fourier transform, quantization ef-
facts, 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 in-
dependent antennas. Prerequisite: EG 608.

718 Microwave Techniques 3 hrs.
Network representations and analysis of microwave devices. Discontinuities from a cir-
cuit point of view. Symmetry consideration. Scattering matrices in circuit design. Cavity
resonators. Prerequisite: EG 609.

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. 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. 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. 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. Prerequisite: EG 635.

737 Advanced Simulation Modeling 3 hrs.
Simulation methodology utilizing GPSS, Q-GERI, and GASPIV simulation languages.
Design, preparation, and execution of continuous, discrete, and combined simulation
models. 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

760 Analytical Methods in Nonlinear Dynamics 3 hrs.
Theory and applications of nonlinear vibration phenomena, transient and steady-state response of nonlinear systems. Prerequisite: EG 661.

762 Wave Motion of Continuous Elastic Bodies 3 hrs.
Dynamics of continuous elastic bodies. Properties of wave motion considered while studying motion of elastic string. Propagation of elastic waves infinite and semi-infinite bodies, cylinders, rods, and beams. Prerequisite: EG 660.

768 Dynamics of Aerospace Vehicles 3 hrs.
Advanced problems in aerospace vehicles, rigid-body dynamics, and stability. Trajectory optimization for space navigation and related topics. Prerequisite: EG 661.

772 Theory of Structural Stability 3 hrs.

773 Theory of Shells 3 hrs.
The first-approximation theory of thin shells, higher approximations, and transverse-shear deformations; geometrical nonlinearities and shell instability. Illustration of theories by selected problems. Prerequisite: EG 671.
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<tr>
<th>Course</th>
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<th>Hours</th>
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</thead>
<tbody>
<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; application to nonlinear partial differential equations in continuum mechanics; theoretical studies of convergence and stability of solutions. Prerequisite: EG 674.</td>
<td></td>
</tr>
<tr>
<td>799</td>
<td>Doctoral Dissertation</td>
<td>3-6 hrs.</td>
</tr>
</tbody>
</table>
Environmental Science Program

Professors Adams (coordinator), Rand; Adjunct Professor Essenwanger; Adjunct Associate Professor Schroer; Adjunct Assistant Professor Carter.

Environmental science courses are taken for several purposes: as science electives that satisfy GER, to build an AOC minor, and to earn an environmental science certificate. 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 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 Science and Biology

<table>
<thead>
<tr>
<th>Course Category</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 102, 303 or 304, 311, 321</td>
<td>13</td>
</tr>
<tr>
<td>Biology--BY 113, 114, 221, 312, 319, and MS 507, BY 531</td>
<td>23</td>
</tr>
<tr>
<td>or BY 561</td>
<td></td>
</tr>
<tr>
<td>BY 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): Biology 113, 114; Chemistry 121, 123, 125, 126; Environmental Science 101, 102; Physics 101, 102; two basic courses in statistics and/or computer science.

Environmental core courses:
- BY 312 Principles of Ecology
- ES 303 Environmental Climatology or ES 304 Environmental Meteorology
- ES 311 Environmental Geology and Hydrology
- ES 321 Pollution Problems
Advanced level specialization (6 hours required in courses in student’s major or area of interest chosen from the following):

BY 526 Microbial Ecology
BY 561 Physiological Ecology
BY 562 Community Ecology
BY 563 Population Ecology
BY 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 304 Environmental Meterology
ES 521 Environmental Data Analysis
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)

101 Planetary and Atmospheric Science 4 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. Lab fee: Level 2.

102 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 2.

303 Environmental 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 101, MA 105, or approval of instructor.

304 Environmental 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 101 and MA 151 or MA 154 or approval of instructor.

311 Environmental 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. Prerequisites: ES 102 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 3. Prerequisites: BY 113, 114, CH 101 (121); BY 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, Howell, Siegrist; Instructor Watkins.

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 for courses 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, 415, 440, and one approved MA course 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>
<tr>
<td>Language (French, German or Russian recommended)</td>
<td>6-12</td>
</tr>
<tr>
<td>Social science (one discipline)</td>
<td>6</td>
</tr>
<tr>
<td>Mathematics (courses numbered below 150)</td>
<td>0-6</td>
</tr>
</tbody>
</table>
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 one science or a science minor
For B.S. ................................................................. 8 hours in physics and 8 hours in biology or chemistry

Mathematics Major (minimum requirements):
MA basic core, MA 352, and MA 551 ........................................ 27
MA electives (must be preapproved by student's mathematics adviser, be at 300 level or above, and include at least one 500-level course) ................. 9
(Note: MA 570 is recommended for students preparing for graduate study in mathematics.)
Minor (see examples below) ................................................ 21-24
Electives (to total number of semester hours to 128) ......................... 10-33

Curriculum II, III, and IV
Because of recent changes by the State Board of Education in its teacher certification requirements, the department is not able at catalog copy deadline time to provide a final state-approved listing of requirements in various program areas (general education, mathematics, professional education). These requirements will be published by the university as soon as they receive final state approval.

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.

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.

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.

The following approved minors are typical of minors chosen by students who major in mathematics. 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.

a. Biology—BY 113, 114, and 13 hours of BY courses with at least 6 of these hours in courses numbered 300 or above.
b. Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 335; 336, 341.
e. Operations research—CS 113, EG 220, 320, 390, 421, 527, and 522 or 526.
f. Industrial engineering—EG 220, 320, 321, 390, 421, 524, and 523 or 526.
g. Computer science—CS 113, 208, 214, 308, and any 9 hours from one of the following options: CS 311, 411, 513, 517, 524, 530 (interest in business or economics); CS 309, 415, 513, 517, 520, 530 (interest in systems design and analysis).

h. A minor of 21 hours in one discipline, including at least 6 hours numbered above 300 approved by department concerned and student's mathematics faculty adviser.
(Note: Students who expect to work in industry or pursue graduate study in applied mathematics are urged to select a minor in science or engineering.)

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 program with the Tuscaloosa campus. Students interested in the cooperative program 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 backgrounds and goals. Consequently, programs of study leading to the M.A. degree can vary considerably. Each graduate student is assigned an adviser who works closely with the student to design an individualized program to meet the student's needs. All programs 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 considerable depth in areas of probability and statistics

b. Those who plan to work in industry or government who will need depth and or 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 approved 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 differential 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 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.

004 Basic Algebra 3 hrs. No credit
For students with a deficiency in high school credit in algebra or a need for algebra review.

033 High School Geometry 3 hrs. No credit
For students with a deficiency in high school credit in geometry. Prerequisite: MA 004 or Level I placement.

104 Introduction to Contemporary Mathematics 3 hrs.
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.

105 College Algebra 3 hrs.
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 of high school algebra and Level I placement.

119 Precalculus I 
3 hrs.
Should be taken only by students who are going on to MA 121 and 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, polynomials, linear equations, quadratic equations, rational functions, exponential and logarithmic functions, systems of equations. Prerequisites: one unit of high school algebra and Level I placement.

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. Circular and trigonometric functions, applications of trigonometry, solution of right and oblique triangles, inverse trigonometric functions, trigonometric equations and identities, complex numbers, polynomials, mathematical induction, binomial theorem. Prerequisite: MA 119 or Level II placement.

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 derivative, antiderivatives, fundamental theorem of calculus, applications of integral. Prerequisites: MA 143 or Level III placement.

153 Calculus and Analytic Geometry 
3 hrs.
Functions, limits, continuity, derivative, differentials, chain rule, implicit differentiation, applications of derivative. Prerequisite: MA 121 or Level III placement.

154 Calculus and Analytic Geometry 
3 hrs.
Definite integral, fundamental theorem of calculus, indefinite integrals, integration by parts, integration by substitution, integration of trigonometric functions and their inverses, trigonometric substitution, improper integrals, applications of the integral, exponential and logarithmic functions. Prerequisite: MA 153.

233 Calculus and Analytic Geometry 
3 hrs.
Hyperbolic functions, partial fractions, l'Hopital's Rule, sequences and series, conic sections, vectors and analytic geometry in three dimensions, vector-valued functions. Prerequisite: 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 spaces, Gram-Schmidt process, linear transformation, change of basis, similar matrices, eigenvalues and eigenvectors, diagonalization, and symmetric matrices. Prerequisite: MA 233 or MA 151 and approval if 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.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>333</td>
<td>Introduction to Geometry</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>352</td>
<td>Introduction to Differential Equations</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>385</td>
<td>Introduction to Probability</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>No credit given to students who have successfully completed MA 585. Finite probability spaces, conditional probability, random variables, expectations, variances, covariances, and introduction to binomial, Poisson, uniform, exponential, and normal distributions. Prerequisites: MA 151 or MA 154 and one MA course at the 200 level or above.</td>
<td></td>
</tr>
<tr>
<td>415</td>
<td>Introduction to Numerical Methods</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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 either a digital computer or a programmable calculator. Lab fee: Level 2. Prerequisites: MA 244, 251, or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>440</td>
<td>Introduction to Discrete Mathematics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Symbolic logic, sets, functions, equivalence relations, partially ordered sets, lattices, Boolean algebras, Boolean rings, graphs, and introduction to semigroups, groups, rings, and fields with applications. Prerequisites: MA 244 and at least one MA course at 300 level or above.</td>
<td></td>
</tr>
<tr>
<td>490</td>
<td>Senior Seminar</td>
<td>1-3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Selected undergraduate topics in mathematics. Prerequisite: approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>502</td>
<td>Introduction to Real Analysis</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>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 either a digital computer or programmable calculator. Lab fee: Level 2. Prerequisites: MA 244, 352.</td>
<td></td>
</tr>
<tr>
<td>521</td>
<td>Introduction to Complex Analysis</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>525</td>
<td>Intermediate Differential Equations</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>526</td>
<td>Partial Differential Equations I</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
</tbody>
</table>
Advanced Vector Calculus
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
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
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
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.

Function of Several Variables
Topology of $E^n$, 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.

Metric Spaces with Applications

Probability
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.

Selected Topics in Mathematics
Courses in selected topics requested. Prerequisite: approval of instructor.

Numerical Methods for Linear Algebra
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 3. Prerequisites: MA 544 and CS 113 or EG 196.

Numerical Methods for Partial Differential Equations
Finite difference methods for parabolic, elliptic, and hyperbolic partial differential equations; error analysis, stability, and convergence of finite difference methods. Lab fee: Level 3. Prerequisites: MA 244, 352, and CS 113 or EG 196.

Special Functions
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.
625 Calculus of Variations 3 hrs.
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.

626 Partial Differential Equations II 3 hrs.
Potential theory, variational and transform methods, integral equations, perturbation theory, and special topics in theory of partial differential equations and their applications. Prerequisite: MA 526.

633 Geometry 3 hrs.
Axioms of incidence and order, affine structure of plane, metric properties, isometries, similarity transformations, group of angles, orientation. Prerequisites: MA 440, 544 or approval of instructor.

640 Graph Theory 3 hrs.
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 MA 542.

643 Group Theory 3 hrs.
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.

644 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.

652 Advanced Differential Equations 3 hrs.
Approximate methods, oscillations and periodic solutions, stability and Liapunov theory, delay equations, and selected topics. Prerequisite: MA 525.

653 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, non-negative functions and of general measurable functions, Fatou's lemma, and Lebesgue-dominated convergence theorem. Prerequisite: MA 570.

656 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.

670 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 ortho-normal sets, Bessel's inequality, Parseval's identity, and conjugate spaces. Prerequisite: MA 570.

671 General Topology 3 hrs.
Topological spaces, bases, subbases, continuity and homeomorphisms, topological properties (first and second axiom of countability, separability, Lindelof property, compactness, connectivity, and separation axioms), heredity of topological properties, generalized products, product topology, product invariance of topological properties, and introduction to Moore-Smith convergence. 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 special topics requested. 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 required for Plan I MA students. Maximum of 9 hours credit awarded upon successful completion of master's thesis.

Real Analysis II 3 hrs.
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 3 hrs.
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 3 hrs.
Selected topics for students in cooperative Ph.D. program. Prerequisite: approval of instructor.

Doctoral Dissertation 3, 6, or 9 hrs.
Required each term a student is working and receiving direction on his Ph.D. thesis in cooperative Ph.D. program. Prerequisite: approval of instructor.

Statistics (ST)

Elements of Statistical Inference 3 hrs.
Descriptive statistics, fundamentals of probability theory, fundamentals of statistical inference, including estimation and hypothesis testing. Laboratory included. Lab fee: Level 2. Prerequisite: MA 154 or 151. Student cannot receive credit for more than one of ST 281, 287, or HBS 231.

Applied Statistics 3 hrs.
Collection and presentation of data, averages, dispersion and skewness, binomial, normal $X^2$, t, and F-distributions, estimation, confidence intervals and tests of significance. Laboratory included. Lab fee: Level 2. Prerequisites: MA 104 or 105 or 119 or Level II placement. Student cannot receive credit for more than one of ST 281, 287, or HBS 231.

Elements of Statistical Analysis 3 hrs.
Analysis of variance and multiple comparisons, analysis of covariance, multiple regression and correlations, nonparametric methods. Prerequisite: ST 281 or approval of instructor.
687 Theory of Statistics I 3 hrs.
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.

787 Theory of Statistics II 3 hrs.
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, Wagner; Research Professors McKnight, Stettler; Adjunct Professors Stuhlinger, Tandberg-Hanssen, Wu; Associate Professors Davis, Rush; Associate Research Professor Hendricks; Assistant Professor Emslie; Assistant Research Professors Comfort, Horwitz, Wilson.

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>Electives</td>
<td>8</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, 104, 105, 201, 241, 310, 311, 312, 331, 351</td>
<td>30</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 III

AOC with double major in physics and secondary education.

Because of recent changes by State Board of Education in its teacher certification requirements, the department is not able at catalog deadline time to provide a final state-approved listing of requirements in various program areas. These requirements will be published by the university as soon as they receive final state approval.

With chemistry minor:

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry—CH 223, 331, 332, 341, 342 or (335, 336)</td>
<td>15</td>
</tr>
<tr>
<td>Education major</td>
<td>30</td>
</tr>
<tr>
<td>Electives</td>
<td>0-4</td>
</tr>
</tbody>
</table>

With mathematics minor:

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics—MA 333, 442, 385 or 585</td>
<td>9</td>
</tr>
<tr>
<td>Education major</td>
<td>30</td>
</tr>
<tr>
<td>Electives</td>
<td>0-10</td>
</tr>
</tbody>
</table>
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 student and his adviser decide the best program of study. After taking placement examination, student must complete a program approval form in consultation with his adviser.

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. 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.
To be admitted to candidacy for the Ph.D. degree, a 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 the 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.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>General Physics</td>
<td>4 hrs.</td>
<td>Introductory course for non-science students. 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. Fall, summer.</td>
</tr>
<tr>
<td>104</td>
<td>Astronomy of the Solar System</td>
<td>3 hrs.</td>
<td>Laboratory with telescope observation included. Lab fee: Level 2. Prerequisite: high school algebra and trigonometry. Winter.</td>
</tr>
<tr>
<td>105</td>
<td>Stellar Astronomy</td>
<td>3 hrs.</td>
<td>Continuation of PH 104, including laboratory with telescope observation. Lab fee: Level 2. Prerequisite: PH 104. Spring.</td>
</tr>
<tr>
<td>111</td>
<td>General Physics with Calculus I</td>
<td>4 hrs.</td>
<td>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. PH 111 and 112 satisfy laboratory science requirements. Lab fee: Level 3. Prerequisite: MA 153. Fall, winter, spring.</td>
</tr>
<tr>
<td>112</td>
<td>General Physics with Calculus II</td>
<td>4 hrs.</td>
<td>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 154. Fall, winter, spring.</td>
</tr>
<tr>
<td>113</td>
<td>General Physics with Calculus III</td>
<td>2 hrs.</td>
<td>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, spring.</td>
</tr>
<tr>
<td>201</td>
<td>Mechanics</td>
<td>3 hrs.</td>
<td>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.</td>
</tr>
<tr>
<td>241</td>
<td>Waves and Oscillations</td>
<td>3 hrs.</td>
<td>Periodic phenomena, free oscillators, forced oscillators, traveling waves, modulation, and Fourier analysis. Prerequisite: PH 201. Prerequisite or parallel: MA 244. Winter, summer.</td>
</tr>
</tbody>
</table>
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. Microscopy theory, absolute temperature, entropy, canonical distribution, and equipartition of energy. Prerequisite: PH 331. Winter.

323 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.

331 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. Prerequisite: PH 201. Prerequisite or parallel: MA 251. (Engineers see EG 307 for prerequisites of PH 331.) Fall, spring.

337 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 331. Summer.

351 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.

401 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.

412 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 2. Summer.

413 Nuclear Physics Laboratory
1 hr.
Statistics in counting processes, beta-ray continuum, scintillation spectroscopy. Fall.

414 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 2. Winter.

415 X-Ray Laboratory
1 hr.
Powder and single crystal X-ray photography with theory as needed. Lab fee: Level 3. Spring.
416 Senior Laboratory 1 hr.
Selected experiments from PH 412 - 415. Lab fee: Level 3. Offered upon demand.

420 Senior Thesis 3 hrs.
Senior original work performed under direction of faculty member. Lab fee: Level 4. Offered upon demand.

431 Intermediate Electricity and Magnetism 3 hrs.
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.
Astronomical concepts necessary for understanding solar systems. Radiation theory, luminosity, mass and size of stars, stellar spectra, color-magnitude diagrams, stellar structure and energy production. Main-sequence stars and ages of stars, galaxies, and the universe. Prerequisite: PH 331. Fall.

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 351, 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: 607. Winter.
622 Kinetic Theory and Statistical Mechanics I
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

660 Introduction to Solid State Physics
Crystal diffraction, reciprocal lattice-binding energies, phonons, thermal properties of insulators, free electron gas and energy bands in crystal. Prerequisite: PH 551. Winter.

665 Introduction to Nuclear Physics
Stable nuclei, isotopes, nuclear reactions, nuclear masses, binding energy, scattering experiments, nuclear cross sections, spins, energy levels, nuclear models. Prerequisite or parallel: PH 552. Spring.

671 Introduction to Elementary Particles
Invariance principles and quantum numbers, symmetry schemes, scattering and reactions, resonances, strong interaction dynamics, and weak interactions. Prerequisite: PH 552. Summer.

680-689 Selected Topic
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
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
Review Lagrangian and Hamiltonian dynamics, canonical transformation, Hamilton-Jacobi theory, Lagrangian field theory, selected topics. Prerequisite: PH 601. Fall.

705 Relativity
Special and general theory. A covariant formulation of electrodynamics. Prerequisites: PH 601, 631, Spring.

711 Problems in Physics I
Application of theoretical principles of physics to an intensive analysis and solution of representative problems. Prerequisites: PH 552, 601, 622, 631.

712 Problems in Physics II
Application of theoretical principles of physics to an intensive analysis and solution of representative problems. Prerequisite: PH 711.

723 Kinetic Theory and Statistical Mechanics II
Advanced topics in kinetic theory and statistical mechanics. Prerequisite: PH 622. Summer

732 Electromagnetic Theory II
Inhomogeneous wave equation and sources. Special relativity, radiation from accelerated charges, and Hamiltonian formulation of electrodynamics. Prerequisite: PH 631. Summer.

741 Optics II
Selected topics from advanced optics. Fresnel and Fraunhofer diffraction, theory of aberrations, theory of partial coherence including laser applications. Prerequisite: PH 541. Winter.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>751</td>
<td>Quantum Mechanics I</td>
<td>3 hrs.</td>
<td>PH 552, 601, 709</td>
<td>Review of basic principles, general formulation in Hilbert space, angular momentum, steady-state perturbation theory, scattering theory and applications.</td>
</tr>
<tr>
<td>752</td>
<td>Quantum Mechanics II</td>
<td>3 hrs.</td>
<td>PH 751</td>
<td>Identical particles, symmetry principles, time-dependent perturbation theory, variational principles, formal scattering theory.</td>
</tr>
<tr>
<td>753</td>
<td>Quantum Mechanics III</td>
<td>3 hrs.</td>
<td>PH 752</td>
<td>Relativistic wave equations, second quantization, interacting fields, Feynman techniques.</td>
</tr>
<tr>
<td>760</td>
<td>Solid State Physics I</td>
<td>3 hrs.</td>
<td>PH 660 or equivalent</td>
<td>Semiconductor crystals, superconductivity, dielectric polarization, ferroelectric crystals, diamagnetism, paramagnetism, ferromagnetism, antiferromagnetism, magnetic resonance, optical phenomena in insulators, point defects and dislocations.</td>
</tr>
<tr>
<td>761</td>
<td>Solid State Physics II</td>
<td>3 hrs.</td>
<td>PH 752, 760</td>
<td>Selected topics from quantum theory of solid state physics including many-body technique, transport properties, optical properties, superconductivity.</td>
</tr>
<tr>
<td>780-789</td>
<td>Selected Topics</td>
<td>3 hrs.</td>
<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>
</tr>
<tr>
<td>792</td>
<td>Physics Seminar</td>
<td>No credit</td>
<td>PH 552</td>
<td>Student reports on journal articles or individual research.</td>
</tr>
<tr>
<td>799</td>
<td>Doctoral Dissertation</td>
<td>3, 6, 9 hrs.</td>
<td></td>
<td>Two term required for M.S. students.</td>
</tr>
</tbody>
</table>
Library Research for Undergraduates

Director John Warren, B.F.A., M.L.S., Associate Professor of Bibliography.

Associate Professors Perreault, Pollard; Assistant Professors Chitwood, Graham, Sharma; Instructors Doherty, Strang, Sloan.

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)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>100</td>
<td>Introduction to Library Research</td>
<td>1 hr.</td>
</tr>
<tr>
<td></td>
<td>Organization of university libraries and their collections, use of major reference sources, and techniques of successful research.</td>
<td></td>
</tr>
<tr>
<td>310</td>
<td>Bibliography of British and American Philology</td>
<td>1 hr.</td>
</tr>
<tr>
<td></td>
<td>Library research methods in British and American philology; production, organization, and utilization of information; reference and research materials. Alternate years.</td>
<td></td>
</tr>
<tr>
<td>316</td>
<td>Bibliography of German Philology</td>
<td>1 hr.</td>
</tr>
<tr>
<td></td>
<td>Library research methods in German philology; production, organization, and utilization of information; reference and research materials. Alternate years.</td>
<td></td>
</tr>
<tr>
<td>318</td>
<td>Bibliography of Romantic Philology</td>
<td>1 hr.</td>
</tr>
<tr>
<td></td>
<td>Library research methods in romantic philology; production, organization, and utilization of information; reference and research materials. Alternate years.</td>
<td></td>
</tr>
<tr>
<td>320</td>
<td>Bibliography of American History</td>
<td>1 hr.</td>
</tr>
<tr>
<td></td>
<td>Library research methods in the subject; production, organization, and utilization of information. reference and research materials.</td>
<td></td>
</tr>
<tr>
<td>330</td>
<td>Bibliography of Business and Economics</td>
<td>1 hr.</td>
</tr>
<tr>
<td></td>
<td>Library research methods in business and economics; its production, organization and utilization of information; its reference and research materials.</td>
<td></td>
</tr>
<tr>
<td>345</td>
<td>Bibliography of the Health Sciences</td>
<td>1 hr.</td>
</tr>
<tr>
<td></td>
<td>Library research methods in health sciences; production, organization, and utilization of information; reference and research materials.</td>
<td></td>
</tr>
<tr>
<td>360</td>
<td>Bibliography of Behavioral Science</td>
<td>1 hr.</td>
</tr>
<tr>
<td></td>
<td>Origin and terminology of behavioral science; production and utilization of information; reference and research materials.</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>380</td>
<td>Bibliography of Music</td>
<td>1 hr.</td>
</tr>
<tr>
<td>385</td>
<td>Bibliography of Art</td>
<td>1 hr.</td>
</tr>
<tr>
<td>400</td>
<td>Theory of Bibliographical Order</td>
<td>2 hrs.</td>
</tr>
</tbody>
</table>
Continuing Education Center
Division of Continuing 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 Health 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
To keep up-to-date, professional people refresh and expand their knowledge throughout their working lives. In no fields is this policy more necessary than in science and engineering. Technical Studies develops and administers in-service training programs and other credit and noncredit activities in scientific and technical areas. These activities fall into three categories: (1) courses that maintain and upgrade basic skills, (2) short courses that present state-of-the-art knowledge, and (3) activities that disseminate technology transfer. The goal of this unit is to serve the technical community by continually designing activities that keep people up-to-date, effective, and competitive in their fields.

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 also has review courses that prepare participants for professional certificate examinations, such as Certificate in Management Accounting review courses, Chartered Life Underwriters study courses, and Quality Engineering Certification review courses.

Health Studies
The primary purpose of Health Studies is to enhance the quality of health and health care for the people in the Tennessee Valley region by developing and administering educational activities for the general public as well as health-care professionals. Responding to this goal, the unit assists professionals to keep abreast of advances in health technology, to pursue knowledge in areas of personal interest, and to acquire expertise necessary for professional development.

Emergency Medical Technician-Paramedic Training
The School of Primary Medical Care offers advanced training to persons involved in emergency medical service who have completed an emergency medical technician-basic course and emergency medical technician-intermediate course. This level of training integrates pathophysiology, pharmacology, and emergency patient management. Upon successful completion of the course, the student is qualified to make application for licensure as an emergency medical technician-paramedic through the State Department of Public Health.

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.

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

Weekend Course Program

The weekend course program was started as a means for students to take credit courses from the standard university curriculum during weekend hours rather than within the conventional weekday class schedule. It is designed for students whose time is restricted by employment, family responsibilities, or other obligations.

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 lifestyles
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3. younger people who will soon be choosing a career
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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.

Speaker’s Bureau

DCE administers the University Speakers Bureau. This bureau consists of faculty and staff members who desire to share information about a wide variety of subjects. Because it is a productive source of information, local
organizations, civic groups, businesses, schools, and governmental agencies are encouraged to take advantage of the bureau's services. Topics covered include areas of controversy, new technology, mental and physical health, and historical aspects of man, as well as current issues. Arrangements can be made for securing a guest speaker by contacting the Division of Continuing Education (205) 895-6010.

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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ALLEN, ANN B., B.A. (Newcomb College of Tulane University), M.A. (University of Alabama, University). Instructor in English, 1968.

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.

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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). Chairman of the Department of Industrial and Systems Engineering and Professor of Industrial and Systems Engineering, 1981.


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BROWN, JESSE C., B.A., M.A. (Jacksonville State University), Ph.D. (Southern Illinois University). Assistant Professor of Political Science, 1981.


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CLARK, JUNIUS M., B.S. (Texas A&M University), Ph.D. (University of Texas). Associate Professor of Biology, 1977.

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ELEY, MICHAEL H., B.A. (West Georgia College), M.S., Ph.D. (University of Georgia). Associate Professor of Biology and Adjunct Associate Professor of Chemistry, 1974.

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HEAMAN, DORIS, R.N. (Deaconess Hospital, Missouri), B.S.N. (University of Alabama in Huntsville), M.S.N. (University of Alabama in Birmingham). Assistant Professor of Nursing, 1977.

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MONTGOMERY, JOHN R., B.S. (University of Alabama, University), M.D. (Medical College of Alabama). Chief of Pediatric Programs, Professor of Pediatrics, and Adjunct Professor of Immunology, 1975.

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SMALLEY, LARRY L., B.S., M.S., Ph.D. (University of Nebraska). Chairman of Physics Department and Professor of Physics, 1967.

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WENZEL, CAROL R., A.B. (Barnard College), Ph.D. (University of Pennsylvania). Assistant Professor of Art, 1980.

WHARRY, RHODA E., B.S.E. (University of Arkansas), M.S. (Memphis State University), Ph.D. (Purdue University). Professor of Education, 1967.


WILLIAMS, LEE E., II, B.A. (Knoxville College), M.A. (East Tennessee State University), Ph.D. (Mississippi State University), Assistant 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.

WILLIAMSON, JOAN, R.N. (Birmingham Baptist Hospital), B.S.N. (University of Alabama, University), M.S.N. (University of Alabama in 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 Associate Professor of Biology, 1972.


WILSON, ROBERT B., B.A. (California State University), M.A., Ph.D. (University of California, Riverside). Assistant Research Professor of Physics, 1980.


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Lecturers

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BURSON, ROBERT A., B.S. (Tennessee Technical University), M.D. (University of Tennessee College of Medicine). Adjunct Assistant Professor of Internal Medicine, 1975.


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CHANDLER, JAMES E., M.D. (University of Colorado School of Medicine). Clinical Assistant Professor of Internal Medicine, 1978.

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ESSENWANGER, OSKAR, B.S. (Technical University, Danzig), Diploma in Meteorology, (University of Vienna), Sc.D. (University of Wurzburg). Adjunct Professor of Environmental Science, 1971.


FISHMAN, GERALD J., B.S. (University of Missouri), M.S., Ph.D. (Rice University). Lecturer in Physics, 1978.


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HEAD, ROBERT, B.S.M.E. (Auburn University), M.S.M.E. (University of Colorado), Ph.D. (University of Alabama, University). Adjunct Associate Professor of Mechanical Engineering, 1959.

HUGHES, CUTTER, A.B. (Davidson College), J.D. (University of Virginia), LL.M. (University of London). Adjunct Instructor in Communications, 1978.

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O'REILLY, GEORGE T., B.S. (Michigan State University), M.S.E. (University of Alabama in Huntsville), Ph.D. (Vanderbilt University). Adjunct Associate Professor of Electrical Engineering, 1975.


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PETTEY, EARL J., B.S. (Western Kentucky University), M.A. (Ball State University). Instructor in Music, 1969.

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SELAH, CHARLES E., B.S. (University of Oklahoma), M.D. (Tulane University School of Medicine). Clinical Associate Professor and Chief of Surgery Programs, 1975, 1979.


SLOYER, JOHN L., JR., B.S. (Moravian College), M.S., Ph.D. (West Virginia University). Research Associate Professor of Microbiology and Immunology in Pediatrics, 1977, 1980.


STEPSHENS, WILLIAM D., B.S. (Western Kentucky State University), Ph.D. (Vanderbilt University). Adjunct Associate Professor of Chemistry, 1974.

STEWART, ROBERT E., B.S., M.D. (University of Tennessee). Clinical Assistant Professor of Pediatrics, 1975.

STUHLINGER, ERNST, Ph.D. (Tubingen, Germany). Adjunct Professor of Physics and Environmental Science, 1976.

SWANN, ALLIE C., B.S. (Mississippi State University), M.A.S. (University of Alabama in Huntsville). Lecturer in Accounting, 1979.


TEMPLE, CRISTA L., B.A. (University of Alabama in Huntsville). Instructor in German, 1980.


TRAYWICK, HILDE, B.A. (Middle Tennessee State University), M.A. (Memphis State University). Instructor in Communications, 1980.


VICK, CHARLES R., B.A. (Oklahoma City University), Ph.D. (Auburn University). Adjunct Associate Professor of Computer Science, 1980.
VIZZINI, SAL VA TORE, B.A. (Shaw University), M.B.A. (University of Miami). Adjunct Assistant Professor of Criminal Justice, 1980.


WALKER, WALTER Y., B.A. (Vanderbilt University), M.D. (Medical College of Alabama). Clinical Associate Professor of Surgery, 1976, 1979.


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WORKMAN, GARY L., B.S. (College of William and Mary), Ph.D. (University of Rochester). Lecturer in Physics, 1975.


Volunteer Faculty

ABELE, HENRY B., B.S., M.D. (Medical College of Alabama). Psychiatry.

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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.

ANDERSON, HENRY L., A.B., M.A., M.D. (Tulane University School of Medicine). Family 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.

BASORE, JOHN W., A.B., M.D. (Medical College of Alabama). Family Medicine.

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COWART, NORTON E., B.S., M.D. (University of Illinois College of Medicine). Internal Medicine.

CROWSON, LAWRENCE B., JR., M.D. (University of Tennessee College of Medicine). Obstetrics and Gynecology.

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Office of Accounting and Financial Reporting
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