1975-1976 Catalog

The University of Alabama in Huntsville

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Academic Calendar

Fall Term, 1975

Early Registration .............................................. July 24 - August 6
Placement Tests ................................................. July 25 and August 25
Orientation ....................................................... August 4 and September 3
Application Deadline ......................................... August 21, Thursday
Registration ..................................................... September 4, Thursday
Classes Begin 8:00 a.m. ..................................... September 8, Monday
Late Registration ................................................ September 8, 9
Deferred Examinations (Summer Term) ................... September 13, Saturday
Mid-Term ......................................................... October 10, Friday
Examinations ..................................................... November 17, 18, 19 and 20

Winter Term, 1975-76

Early Registration ............................................... October 23 - November 5
Placement Tests .................................................. November 21, Friday
Orientation ....................................................... December 3, Wednesday
Application Deadline .......................................... November 26, Wednesday
Thanksgiving Holidays ........................................ November 27, 28
Registration ...................................................... December 9, Monday
Classes Begin 8:00 a.m. ....................................... December 8, 9
Late Registration ................................................ December 8, Monday
Deferred Examinations (Fall Term) ....................... December 13, Saturday
Student Christmas Holidays ................................. December 22 - January 2
Classes Resume 8:00 a.m. ..................................... January 5, Monday
Mid-Term ......................................................... January 23, Friday
Examinations ..................................................... March 1, 2, 3 and 4

Spring Term, 1976

Early Registration ............................................... January 29 - February 11
Placement Tests .................................................. February 27, Friday
Orientation ....................................................... March 10, Wednesday
Application Deadline .......................................... March 4, Thursday
Registration ..................................................... March 11, Thursday
Classes Begin 8:00 a.m. ..................................... March 12, Friday
Late Registration ................................................ March 12, 15
Deferred Examinations (Winter Term) ..................... March 13, Saturday
Mid-Term ........................................................ April 15, Thursday
Student Spring Holidays ..................................... April 16, Friday
Examinations ..................................................... May 24, 25, 26 and 27
Commencement .................................................. May 30, Sunday
Summer Term, 1976

Early Registration ............................................. April 22 - May 5
Placement Tests .................................................. May 24, Monday
Orientation ...................................................... June 1, Tuesday
Application Deadline .......................................... May 27, Thursday
Registration ..................................................... June 3, Thursday
Classes Begin 8:00 a.m. ...................................... June 4, Friday
Late Registration ................................................ June 4, 7
Deferred Examinations (Spring Term) ....................... June 5, Saturday
Student Holidays ................................................ July 5, Monday
Mid-Term ............................................................ July 9, Friday
Examinations ..................................................... August 16, 17, 18 and 19

Class Periods

Monday, Wednesday, Friday

<table>
<thead>
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<th>Period</th>
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<tr>
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<td>9:25 a.m. – 10:40 a.m.</td>
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<td>C</td>
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<tr>
<td>D</td>
<td>12:15 p.m. – 1:30 p.m.</td>
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<tr>
<td>F</td>
<td>1:40 p.m. – 2:55 p.m.</td>
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<tr>
<td>G</td>
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<td>H</td>
<td>4:35 p.m. – 5:50 p.m.</td>
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<td>S</td>
<td>6:00 p.m. – 8:00 p.m. (MW only)</td>
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Tuesday, Thursday

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<td>P</td>
<td>10:10 a.m. – 12:10 p.m.</td>
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<td>R</td>
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The UAH Term System

UAH operates on a system in which four identical terms, each spanning 12 weeks, constitute a calendar year.

Credit for course work is granted in standard semester hour units.
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The University of Alabama in Huntsville is an Equal Opportunity Institution and welcomes applications for employment and educational programs from all individuals regardless of race, color, religion, sex, age, or national origin.
Legend
1. Morton Hall
2. Art Museum
3. University Union
4. Humanities Building
5. Library
6. Environmental and Energy Studies Building
7. Science Building
8. Pre-School Learning Center
9. Ashburn House
10. School of Primary Medical Care, University Health Center Building
11. Madison Hall
12. Research Institute
UAH Parking

The University
Of Alabama
in Huntsville

Campus Map
Statement of Purpose

The University of Alabama in Huntsville is dedicated to the intellectual, aesthetic, social, and economic advancement of the state and region it serves, and to the proposition that it can best aid in this advancement by being a competent member of the national and international academic communities.

Such membership requires constant attention to teaching, research, and interaction with the local, state, and regional communities. It demands a steady allegiance to the academic values: an atmosphere conducive to the unhindered pursuit of knowledge and the education of students primarily 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. Progressively, 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 centers gives it highly unusual opportunities for new and creative programs in engineering and the natural sciences. Huntsville, as a city which has peacefully managed drastic social and economic change, offers a rich field of discovery in the 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 its programs, the University intends to seize all of these advantages by incorporating new academic disciplines, enriching traditional studies, and creating fresh academic approaches as the 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 of 1969, the Board of Trustees established the University of Alabama System with three independent, autonomous campuses—Huntsville, Birmingham, and Tuscaloosa. Each campus has a separate president, who reports directly to the Board of Trustees. Academic programs were initiated in Huntsville in 1950; in 1963 degree opportunities at the master's level were provided; in 1964 degree programs at the baccalaureate level were initiated. The first master's degree based on work begun and completed in Huntsville was awarded in 1964; the first undergraduate degrees were awarded in 1968. Doctoral programs in physics and engineering were initiated in 1971. In 1973, UAH received its first resident 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 of UAH are still in the developing stages, a characteristic of viable programs in any university. UAH was brought into being and is growing to meet the specific needs of scientific and technological enterprises and the cultural and intellectual needs of a rapidly expanding region.

Since the UAH program 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 better in a complicated environment.

UAH is supported by the state, federal, and local governments, and by generous individuals and industries. The existing programs strive for superiority within limited areas and though expansion is anticipated, a wide variety of specialties is not planned for the foreseeable future.
The degree programs at UAH are administered by: The School of Humanities and Behavioral Sciences, The School of Science and Engineering, The School of Nursing, and The School of Graduate Studies and Research. Medical students taking Phase II clerkships and Phase III 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 School of Humanities and Behavioral Sciences offers the Bachelor of Arts degree with majors in art, criminal justice, economics, English, French, German, history, music, political science, psychology, Slavic studies, and sociology. The Bachelor of Science in Business Administration degree is offered with majors in accounting, finance, and management. The Master of Administrative Science degree and a Master of Arts degree in developmental learning are offered, and a Master of Arts degree in English was added in 1974-75. Programs for both elementary and secondary teaching certification are available, and graduate courses in education are also offered. In addition, course work is available in Russian, Spanish, philosophy, speech, physical education, and journalism.

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, and the Bachelor of Science degree with majors in biology, chemistry, engineering, mathematics, mathematics education, and physics. In addition, courses are offered in computer sciences, earth sciences, natural sciences, and statistics.

The undergraduate program in engineering is founded on a unified and broad core curriculum with options of specialization in computer engineering, electrical engineering, environmental engineering, industrial and systems engineering, mechanical engineering, and structural engineering. The program requires a number of courses in liberal arts and emphasizes a strong support in 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 chemistry, Master of Science in Engineering degree with several areas of specialization (see the engineering programs for further detail), 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 Doctor of Philosophy degree in chemistry can be obtained through a cooperative program with The University of Alabama, Tuscaloosa, with one year residency at the Tuscaloosa campus.

The School of Nursing offers the Bachelor of Science in Nursing degree. The program is a flexible one aiming toward the development of persons who can assume responsible citizenship while practicing nursing. The program is fully approved by the Alabama Board of Nursing and accredited by the National League for Nursing.
The School of Primary Medical Care is a developing clinical school of medicine with a residency program in family practice and clerkships and electives for students in the University of Alabama System Medical Education Program, which includes the medical schools at Birmingham, Tuscaloosa, and Huntsville. Students in the tri-campus Medical Education System take their Phase I training (Correlated Basic Medical Science) in Birmingham; all three campuses offer components of the Core Clinical Experience (Phase II) and the Individualized Experience (Phase III).

The Division of Continuous Education offers credit and non-credit activities in a variety of subjects to provide for individual enrichment and professional advancement. In programs primarily for adults, the Division offers the Associate Certificate in child development, law enforcement, and interior decoration, and the Post-Graduate Certificate in a number of areas of administration and technology. The Division also operates the UAH Press and has a co-op program for undergraduate students.

The UAH Library is being developed to give maximum support to the academic and research programs. Its more than 130,000 volumes of monographs and journals reflect great care in selection; its more than 172,000 items in such forms as microfiche, federal documents, maps, technical reports, and sound recordings provide supplementary sources for special purposes. Acquisition of library resources is given high priority in the development at UAH. Courses in bibliography are offered by members of 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 the graduate level.

Students admitted to UAH have achieved 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 insure admission to those who are well qualified for collegiate education. Students are assured that faculty members are present to help but not "oversee" them; and because of assumed maturity, students are expected to seek counseling and special assistance as needed.

The faculty at UAH has been assembled from leading universities throughout the United States and abroad. The quality of this faculty is evident when measured by its writings, its research, and its reputation in the academic world.

The University of Alabama in Huntsville is an institution which has some distinctive features and unusual strengths. The information contained in this publication is designed to outline in more detail the policies, purposes, and programs of The University of Alabama in Huntsville.
The 332 acre campus of The University of Alabama in Huntsville is located in Northwest Huntsville adjacent to Research Park. The eight campus University buildings, all of which have been constructed since 1960, contain modern equipment and exemplify modern functional design.

Morton Hall houses classrooms and offices for the behavioral sciences, the School of Nursing, the Division of Student Affairs, the Office of Admissions and Records, and the textbook store.

The Science-Engineering Building contains classrooms and laboratories for the undergraduate physical and biological sciences, chemistry, and engineering programs. It also houses offices for some of the faculty in the School of Science and Engineering. The building is equipped with modern laboratory equipment including a penthouse containing a live animal room and greenhouse.

The three-story Library building is the first 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 125,000 volumes. The library has open-access stacks and student typing equipment. Services of subject specialists are available for the students.

Madison Hall (formerly the Graduate Studies Building) contains executive administrative offices, graduate classrooms, the Departments of Mathematics and Education, and the administrative offices and classrooms of the Division of Continuous Education.

The Research Institute Building houses offices for some of the faculty in the School of Science and Engineering, laboratory space and equipment to support experimental research in sciences and engineering classrooms, Office of the School of Science and Engineering, and the Univac Computer System.

The two-story University 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 paperback bookstore.
The Humanities Building, a two-building complex, houses programs in music, art, English and history. In addition to serving the instructional programs in the humanities, the facility contains large lecture rooms for varied University programs.

The first campus building for the School of Primary Medical Care houses administrative offices and medical facilities. The medical school’s Ambulatory Care Center, located in the Huntsville Medical District downtown, includes among its facilities the UAH-Huntsville Hospital Family Practice Center, faculty offices, a learning resource center, and a library.

**Instructional Media Services**

A comprehensive program of audio-visual services compliments instruction at The University of Alabama in Huntsville. The faculty may select from a variety of instructional aids to enrich their teaching efforts. The instructional media service loans 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, tapes, etc. from the leading universities of the nation.

**University Housing**

The University’s Community Housing is available to full-time students, single and married, and to faculty and staff. The two- and three-bedroom apartments are located within walking distance of the campus. All apartments are fully air-conditioned and carpeted and are equipped with kitchen appliances. Furnished apartments include basic living room, dining area, and bedroom furniture. Monthly rental rates for Community Housing are as follows:

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<td>3 Students per Apartment</td>
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<tr>
<td>(private room)</td>
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The cost of utilities (gas, electricity, water, sewage, and garbage) is included in these rates.

Assignments are made on the basis of application date with students receiving first priority. Alternative assignments and rental plans must be approved by the Director of Housing. Application forms and additional information may be obtained from the Office of University Housing, P. O. Box 1247, The University of Alabama in Huntsville, or by calling 895-6108.
Admissions Information

The University of Alabama in Huntsville welcomes inquiries and applications from interested persons who wish to further their education. The UAH 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 other activities. Application for admission should be made 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 are encouraged to apply during their senior year in high school. Tentative admission will be granted on the basis of ACT scores and high school records through the 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 Admissions and Records Information Desk located in Morton Hall.

Admission to the Freshman Class

Plan A

High school graduates may be admitted as freshmen to The University of Alabama in Huntsville 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.)

All applicants should present a minimum of 16 high school units in the following categories:

4 Units English
1 Unit History or Social Studies
1 Unit Algebra
1 Unit Geometry
9 Units of Electives (at least 5 electives should be academic in nature)
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; however, the deficiencies must be removed during the first year of enrollment in a manner approved by the appropriate dean. Courses taken to remedy entrance deficiencies cannot be used to satisfy degree requirements.

Plan B

Persons who have not been graduated from high school may be admitted on the basis of satisfactory scores achieved on the General Educational Development Test (GED). The University of Alabama in Huntsville serves as 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 Counseling and Testing.

Application Procedure

Applicant must submit:
1. Completed application forms in duplicate.
2. Non-refundable application fee of $15.00.
3. A Student Medical Form.

In addition, he must request that:
1. Two copies of his high school transcript be sent from the high school to the Office of Admissions and Records and
2. (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 specified dates in the UAH calendar.

Admission of Academically Talented High School Students

UAH welcomes inquiries from academically talented high school students who may wish to enroll in courses for college credit during the summer term between their junior and senior year 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 at UAH.
Admission of Transfer Students

Students who have previous academic records at a college or university level may be admitted to UAH as transfer students. For all students who intend to graduate from UAH, transfer credits are evaluated in the Office of Admissions and Records prior to 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. It must be understood that acceptance and application of credits are two separate and distinct processes.

Credits earned in terms of quarter hours will be converted to semester hours on the basis of 2/3 of one semester hour for each quarter hour.

Students Transferring within the University System

The University of Alabama System is composed of three campuses — Huntsville, Tuscaloosa, and Birmingham. A student enrolled in an undergraduate division at any U. of A. campus may transfer to an undergraduate division at another U. of A. campus so long as he is eligible to continue enrollment in the University. He will receive credit for courses in which a passing grade has been made.

Students Transferring from Other Institutions

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 and be eligible to return to the last institution attended in order to qualify for unconditional admission. An applicant with less than an overall C average may be admitted on probation upon recommendation of the dean of the school in which he plans to major, provided:

1. The quality point average is at least 0.75 (1.00 = C); and
2. The quality point deficiency is less than 8.

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 may be considered for admission on the basis of high school grades and ACT scores.

In the case of students admitted under these conditions, transferred courses with grades of D are not accepted.

If the previous record was earned at an institution not holding regional accreditation, the applicant may be admitted as outlined; but accepted credits will be classified as provisional and his evaluation will bear the notation "provisional credit." Full credit for the provisional credit will be based upon performance during the first 30 semester hours attempted at UAH. Each student 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.
If a student is transferring from a junior college and has previous credits from a senior college, his credits for transfer will be evaluated on an individual basis and may be limited to 64 hours.

Application Procedure

Applicant must submit:
1. Completed application forms in duplicate.
2. Non-refundable application fee of $15.00.
3. A Student Medical Form.

In addition he must request that:
1. Two copies of his high school transcript be sent from the high school to the Office of Admissions and Records.
2. Two copies of official transcripts from each collegiate institution attended be sent directly from the previous institutions to the Office of Admissions and Records.

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

Admission of Irregular Post Graduate (IPG) Students

Applicants already holding a bachelor's or other higher degree will be considered for admission in the status of irregular post graduates.

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; however, credits earned in these courses while a student is classified as an IPG will not carry graduate credit.

Application procedure is the same as that for Admission of Transfer Students. (High school transcripts are not required.)

Admission of Transient Students

To qualify as a transient student a person must be currently enrolled in good standing at another institution (including either of the University of Alabama's other two campuses) and interested in attending UAH for one term only.

Completed Transient Application Forms (in duplicate) and a Letter of Good Standing Form must be submitted for approval to the Office of Admissions and Records prior to the registration period of the term the student wishes to attend.
Admission of Audit Students

A person desiring to attend courses or lectures without examination or credit may be admitted on the basis of information required on the Audit Application Form. (Regularly admitted students may register to audit credit courses without separate application.) An auditor may not obtain credit in a course by retroactive action after announced deadlines for changes. (See section on Course Changes.)

Admission of Foreign Students

In addition to fulfilling the specified entrance requirements or their equivalents, a foreign student (this applies to any person whose official residence is other than the United States) must submit a satisfactory score on the Test of English as Foreign Language unless his native language is English. Each foreign applicant must also give evidence of financial ability to meet the expenses of his intended stay at UAH.

Foreign students are advised to submit applications earlier (preferably 3 months) than announced deadlines for other students. All inquiries should be directed to the Office of Admissions and Records.

Admission of Special Students

Freshman:
An individual who has applied and who does not qualify as a regular beginning freshman may be admitted to UAH as a special student. The special student will be limited to an accumulated maximum of 15 semester hours. (It is recommended that he schedule 6 semester hours in the first term and no more than 9 semester hours in his second term.) At the conclusion of 15 semester hours, the special student may be admitted as a regular degree-seeking student if his overall record reflects a C average. It is the student's responsibility to petition to become a regular student by filing the appropriate application.

Transfer:
An individual who has applied and who does not qualify as a regular transfer student may be admitted on probation as a special student. As such, he will be limited to an accumulated maximum of 15 semester hours. At the conclusion of 15 semester hours, the special student may be admitted as a regular student if he has attained an overall C average including transferred work. If, at the end of 15 semester hours, he has made substantial progress toward an overall C average, he may petition for renewal of the special student status for an additional 15 semester hours.

Foreign:
A foreign student may also be admitted as a special student if his Test of English as Foreign Language score prohibits regular admission. Subsequent admission as a regular student is subject to the same conditions as the new student and the transfer student.
I.P.G.:
An individual holding a bachelor’s degree, or higher, may apply to attend UAH as a special student. He, also, will be limited to an accumulated total of 15 semester hours and will be expected to qualify for admission as an irregular post graduate student or as a graduate student if he plans to continue his studies at UAH.

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 in order to determine his status and the conditions under which he may resume his studies.

Admission to the Graduate School

Detailed information concerning admission to the Graduate School will be found in the section on the School of Graduate Studies and Research.

Admission to Student and Resident Medical Programs

Information concerning admission to the University of Alabama School of Medicine and to the UAH residency programs will be found in the section on the School of Primary Medical Care.

Non-Matriculated Students

Persons registering for courses offered through the Division of Continuous Education may enroll as non-matriculated students. Credit earned while in this category remains on file with the Continuous Education Division. If the student is later admitted to UAH, the credit may be requested to be accepted into the regular records, subject to the standard regulations governing transfer credit.

A non-matriculated student may complete application procedures at the time of registration. No transcripts or other credentials are required. A non-matriculated student must certify that he or she is:
1. a high school graduate or has a satisfactory score (50 or higher) on the GED,
2. has the stated prerequisites for the course desired, and
3. is not under current suspension from another collegiate institution.
Financial Information

Expenses per Term

Full-Time Students Taking 8 to 13 Semester Hours (Undergraduate) ........................................ $198.00

Full-Time Students Taking More Than 13 Semester Hours (Undergraduate) ........................................ $198.00
 (plus $20 per semester hour for each hour in excess of 13.)

Full-Time and Part-Time Students Taking 5 or More Semester Hours (Graduate) ......................... $228.00

The above identified costs include course fees, building fees, student union fees, registration fees, and a student activity fee.

Part-Time Students Taking 7 or Less Semester Hours (Undergraduate)
Registration Fee .................................................. $ 3.00
Course, Buildings, and Student Union Fees per Semester Hour ........................................ $ 25.00*
Student Activity Fee ........................................ $ 4.00

Registration Fee for Courses on Semester Basis ................................................................. $ 4.50

Part-Time Students Taking 4 or Less Semester Hours (Graduate)
Registration Fee .................................................. $ 3.00
Course, Buildings, and Student Union Fees per Semester Hour ........................................ $ 50.00*
Student Activity Fee ........................................ $ 4.00

An estimated average cost of books per term for full-time students is $50.00.

The University reserves the right to change its fees, charges, rules, and regulations at the beginning of any term and without previous notice.

*A Student Union Fee of $1.75 is included in the cost of the first hour only for each person enrolled each term.
Payment of Fees

A Fee Statement showing total amount due will be mailed to each student each term. Payment should be made by check if possible and mailed to the Cashier’s Office along with the Fee Statement. If a student does not receive a Fee Statement within several days after registration, he should contact the Cashier’s Office. It is the student’s responsibility to see that his account is paid by the final date for payment indicated on the statement.

Students with tuition assistance must contact the Cashier’s Office before the first due date.

Audit Fee-Same as for Credit.

Full-Time students may include full-term, regular credit courses offered by Continuous Education under the maximum fee structure of UAH. However, standard fees and fee conditions do not apply for short-term, off-campus, or non-credit offerings. Additional information may be found in this catalog under the heading, Division of Continuous Education.

Other Charges

Addition of Course Fee ................................................. $ 5.00
Change of Course Fee .................................................. 5.00
Examination Fee (Deferred or Special) .......................... 2.00
   (A student missing more than two examinations is one term is charged a maximum fee of $5.00)
Installment or Deferred Fee ........................................... 5.00
   (Accounts not paid in full within five (5) University working days after the first due date will be charged a deferred payment fee.)
Laboratory Fee (Biology, Chemistry, Natural Science, Physics, Psychology) ........................................ 15.00
Studio Instruction (Music)
   Private Instruction - 2/3 Sem. Hr. Cr. ......................... 20.00
   Private Instruction - 1 1/3 Sem. Hr. Cr. ..................... 30.00
Late Payment Fee ...................................................... 10.00
Late Deferred Payment Fee .......................................... 5.00
Late Registration Fee (in addition to regular registration fee) .................. 10.00
Returned Check Handling Fee
   1st Check ........................................................... 1.00
   2nd Check ........................................................... 2.00
   3rd Check ........................................................... 5.00
Replacement of I.D. Card ............................................. 2.00
Transcript Fee-first transcript free-each additional copy 2.00
   No transcript will be issued for a person who has a financial obligation to the University.
Cap and Gown Rental or Purchase-Handled through the Book Nook
Graduation Fees ........................................ $15.00
(If qualifications for graduation are not met and if diploma has been ordered,
$10.00 will be refunded.)
Duplicate Diploma .................................. 7.50
Thesis Binding Fee (3 copies) ................... 13.00
Each Additional Copy ............................. 4.25
Vehicle Registration Fee ......................... 5.00

Fees may be paid in two equal installments. An additional charge of $5.00 is made
for this option. Accounts not paid in full within five (5) University working days
after the first due date will be classified as being deferred. A statement will be
mailed to the student for the installment due. Payment must be made by the
deadline date designated on the statement; otherwise, a late penalty plus a deferred
payment fee will be charged. All reasonable cost incurred in collecting a delinquent
account will be added to the amount due. Students may not attend classes during a
subsequent term if they have any financial obligation to The University of Alabama
in Huntsville for any previous term.

Regulations concerning traffic and parking will be distributed at registration.

Withdrawals and Refunds

After a student has registered, he will be carried on the class rolls until such time as
written notification is received that he has withdrawn. It is the student’s
responsibility to withdraw officially in accordance with University regulations. See
Student Academic Information Section on “How to Withdraw.” Basic fees (course,
building fund, and lab fee) will be pro-rated according to the withdrawal schedule
below. All other applicable fees must be paid in full.

Withdrawal after registration is completed but before first class meeting of the
course
Charges—Registration fee

Withdrawal during first week of classes
Charges—25% of basic fees

Withdrawal during second week of classes
Charges—50% of basic fees

Withdrawal during third week of classes
Charges—75% of basic fees

Withdrawal after third week of classes
Charges—100% of basic fees

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

General Fee (per calendar year, payable quarterly) ..................... $1,600.00
Out-of-State Residents (per calendar year, payable quarterly) ........ 3,200.00

UAH Student Health Service Fee (per academic quarter) ................ 25.00
Hospitalization Insurance (per calendar year) .......................... Variable

Student Activity Fee (per academic quarter) .............................. 8.00
Building Fee (per academic quarter) ...................................... 30.00
Registration Fee (per academic quarter) ................................. 3.00
Vehicle Registration Fee (per calendar year) ............................ 5.00

Late Registration Fee ....................................................... 10.00
Installment or Deferred Payment Fee ...................................... 5.00
Late Payment Fee ........................................................... 10.00
Late Deferred Payment Fee ................................................ 5.00

Student Aid

The University of Alabama in Huntsville has several programs to assist students in financing their college education.

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 students find employment and awards scholarships and loans to qualified students 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.

The Financial Aids and Placement Office has prepared a booklet, Financial Aids to Students, which lists scholarships, grants, loans, and types of employment available to students.

A student should make his financial plans well in advance of entering the University. He is advised to write to the Financial Aids and Placement Office requesting Financial Aids to Students, at the same time that he makes application to the University. Applications for student aid should be filed at the Financial Aids and Placement Office 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

The University of Alabama in Huntsville participates in the American College Testing Program (ACT) Need Assessment. The amount of financial aid granted a student is based upon financial need. ACT assists colleges and universities in
determining the student's need for financial assistance. Students are required to submit a Family Financial Statement (FFS) to ACT designating The University of Alabama in Huntsville (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 Financial Aids and Placement Office of The University of Alabama in Huntsville.

Types of Financial Aids

Scholarships

Most scholarships at UAH are awarded for the academic year (nine months) and are seldom available for the summer term. Nearly all scholarships are awarded on a merit-need basis. Most available scholarships vary from $100.00 to $1,000.00.

It is not necessary, and often not advantageous, to apply for a particular scholarship. The student's need and scholastic ability will be the factors considered in determining the value of the scholarship offered him. When a student completes the regular scholarship application form, he will be considered for all undergraduate scholarships awarded by The University of Alabama in Huntsville.

The following scholarships are awarded annually:

KELLY ZETTLE MEMORIAL SCHOLARSHIP
This 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.

GERHARD B. HELLER MEMORIAL SCHOLARSHIP
This scholarship was established in memory of the late Mr. 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 student majoring in physics or chemistry. The recipient must have an overall 2.0 quality point average and not less than a 2.5 average in physics (if a physics major) or in chemistry (if the student is a chemistry major). The scholarship shall be in the amount of the earned interest or dividends on hand as of the time of the granting of the scholarship, however, it is not to exceed $1,000.

SAMUEL PALMER MEMORIAL SCHOLARSHIPS
The Board of Trustees of the University of Alabama established in 1967 a scholarship trust fund of $17,217.19 to be known as the Samuel Palmer Memorial Scholarship Fund. The interest from this 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.
CARL T. JONES ENGINEERING SCHOLARSHIPS
This scholarship was established from donations to UAH and The University of Alabama Huntsville Foundation in the memory of the late Carl T. Jones, prominent Huntsville businessman and civic leader. It is awarded annually to two full-time freshman students majoring in engineering and indicating a desire to practice this profession in Alabama.

AMERICAN INSTITUTE OF INDUSTRIAL ENGINEERS, INC., SCHOLARSHIP
The North Alabama Chapter of AIIE provides two scholarships each year in the amount of tuition for one term. A recipient is selected for the fall term and another for the spring term. To be eligible the student must be a full-time undergraduate student who intends to specialize in industrial and systems engineering.

PRESIDENTIAL SCHOLARSHIP
A scholarship award in the amount of $600 is made each year to a rising senior who, in the judgement of the President, has made the most significant contribution to The University of Alabama in Huntsville and who shows unusual potential for leadership. A quality point average of 2.5 or better is required.

WERNHER VON BRAUN SCHOLARSHIP
This scholarship, created in honor of Dr. von Braun by his numerous friends, is awarded annually to a full-time junior or senior student. 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.

UNIVERSITY WOMEN'S CLUB SCHOLARSHIP
A tuition scholarship is awarded annually by the University Women’s Club to a full-time student at UAH with sophomore standing having a minimum 2.0 grade point average. The recipient must be an academically deserving student who has demonstrated leadership or a potential for leadership.

HUNTSVILLE MUSIC STUDY CLUB SCHOLARSHIP
The Huntsville Music Study Club, an affiliation of the Alabama Federation of Music Clubs, provides a scholarship each year in the amount of $150 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.

UNIVERSITY DEPARTMENTAL TUITION SCHOLARSHIPS
These scholarships are awarded by individual academic departments to students demonstrating outstanding scholarship. Each scholarship covers the basic tuition, excluding special fees and laboratory fees, for the period of three consecutive terms. To be eligible the recipient must: be a full-time undergraduate student who has completed a total of at least 59 credit hours but no more than 91 credit hours by the end of the term in which he/she 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; be in good financial standing with the University.
ALABAMA SOCIETY OF PROFESSIONAL ENGINEERS
A scholarship is 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.

UNIVERSITY OF ALABAMA HUNTSVILLE FOUNDATION SCHOLARSHIPS
These scholarships are 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.

GORGAS SCHOLARSHIP
UAH 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.

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

NATIONAL DIRECT STUDENT LOAN PROGRAM
These loans are available to all students who are enrolled at least half-time and who have financial need as indicated by the Family Financial Statement. An undergraduate may be eligible to borrow a maximum of $5,000 over a period of 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 cancelled if the borrower performs military service in hostile areas. Forgiveness is also provided for teachers of handicapped and disadvantaged students and for those teaching in other special programs designated by the U. S. Office of Education.

GUARANTEED LOAN PROGRAM
The Guaranteed Loan Program provides federal backing for loans made through private lending agencies such as banks, savings and loans, and credit unions. Loans are made directly by these agencies.

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. This aggregate maximum may be extended to $10,000 for students who borrow for graduate study.
Any student whose adjusted family income is less than $15,000 will automatically qualify for Federal interest benefits on loans totaling up to $2,000 in any academic year. However, the maximum loan may never exceed the cost of education less other financial aid received. Students with adjusted family incomes of less than $15,000 who wish to apply for subsidized loans in excess of $2,000, or students having adjusted family incomes of $15,000 or greater and applying for a subsidized loan of any amount must submit to the lender the school’s recommendation for a subsidized loan based upon the school’s assessment of the family’s ability to pay for the cost of education.

EMERGENCY STUDENT LOAN FUND
Any full-time University of Alabama in Huntsville student who is officially enrolled and physically present on the campus is eligible to apply for an emergency loan. These loans are to be 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 period of 90 days or until the end of the term whichever comes first. Applications are available from the Financial Aids and Placement Office.

EMERGENCY NURSING LOAN
Any full-time University of Alabama in Huntsville student enrolled in the School of Nursing is eligible to apply for a loan. These loans are made only for emergency situations. The maximum loan is $200 and the maximum loan period is 90 days and should not normally be extended beyond the school term in which the loan is to be made. The need for loans will be identified by the School of Nursing. Applications are available from the Financial Aids and Placement Office.

Grants

SUPPLEMENTAL EDUCATIONAL OPPORTUNITY GRANTS
Provides aid to undergraduate students of exceptional financial need who would not, except for the grant, be financially able to attend college. This program provides grants for up to one-half of the student’s total need. 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 and unless a major change in the family’s financial condition causes the student to be ineligible.

BASIC EDUCATIONAL OPPORTUNITY GRANT PROGRAM
The purpose of the Basic Educational Opportunity Grant Program is to assist in making available the benefits of post-secondary education to eligible students by providing assistance in meeting the cost of such education.

The maximum award a student may receive under this program is $1,400 minus the amount the student and his family are expected to contribute toward the cost of his education. (This amount is called the Family Contribution.) The actual grant, however, may be less than this maximum award. The amount of the Grant is based on the Family Contribution and two other factors: (1) the amount of funds actually available for the Program for that particular year; and (2) the cost of the student’s education, since the Grant cannot exceed one half the cost.
In order to be eligible a student must meet the following criteria:

1. establish financial need by means of the BEOG application
2. have begun or will begin post high school education after April 1, 1973. If the student has taken college courses while still attending high school or enrolled in a remedial program before April 1, 1973, he is still eligible to apply.
3. be enrolled as a full-time student in an eligible program at an eligible college, university, vocational or technical school.
4. be a U.S. citizen or in the United States for other than a temporary purpose and intend becoming a permanent resident or be a permanent resident of the Trust Territories of the Pacific Islands

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 may work either on or off the campus.

In determining eligibility, preference will be given to students with the greatest financial need.

Graduate Fellowships and Assistantships

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

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 the opportunities for youth seeking careers in nursing by providing long-term, low interest loans and scholarships to students who are 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 a permanent resident 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 lesser. The maximum amount loaned during a twelve-month period to any student enrolled in a school which 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 this assistance in order to pursue a course of study.
State Nursing Scholarships

An act was passed by the Alabama Legislature in 1957 to provide scholarships for basic nursing education. These scholarships are in the amount of $600 each to be awarded to applicants from the State-at-large. Applicants must be residents of Alabama and accepted for admission by The University of Alabama School of Nursing. Continuation of the scholarships 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 the State of Alabama for at least one year immediately after graduation from The University of Alabama in Huntsville School of Nursing. In case the recipient finds that he is unable to practice nursing in Alabama after graduation as intended, he may be released from his promise by repaying the amount of the scholarship received to The University of Alabama in Huntsville Nursing Scholarship Fund.

Job Placement

In addition to assisting students in obtaining financial aid, UAH provides the following job placement services to all students and alumni:
1. Part-time employment opportunities either in the local community or within the University.
2. Full-time placement opportunities for graduating UAH seniors and for UAH alumni.

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

A complete and permanent personnel file, including a summary of college activities and confidential evaluations from faculty members, is established for each student who registers with the Placement Office. Information in this file is available to employers upon request.

Cooperative Education Plan

UAH has a Cooperative Education Program which is available to a limited number of students. Participants in the program alternate periods of full-time study and career-related work. Although it takes longer to graduate under this plan, the degree is greatly strengthened by the practical experience that is gained.

Organizations which employ co-op students pay them for their services. Participation in the program can assist students in defraying a part or all of their education expenses.

Information concerning the Cooperative Education Program is contained in this catalog under the section on the Division of Continuous Education.
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 help financially persons pursuing or interested in pursuing law enforcement careers.

UAH participates in the Law Enforcement Student Grant Program. This grant program provides payments for tuition, fees, and books, not to exceed $250 per term. Those students awarded grants must agree to remain in the service of their employing agencies for a period of 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 UAH Financial Aids and Placement Office. It is advised that these forms be obtained, completed, and returned well in advance of the period of study for which they apply.

Veterans

Under the Veterans Educational Assistance Program, which affects most veterans, the veteran receives his allowance directly from the government. He is responsible for paying his fees directly to the University and meeting payment deadlines applicable for all students.

The Veterans Administration will make full payment only when the student's schedule includes at least 8 semester hours per term. In order to facilitate the prompt and accurate reporting of the student’s status and course load, it is necessary that the student complete a brief form at the University’s Office of Veterans Affairs every term that he is enrolled. This office is located in Room 123, Morton Hall.

It is the student's responsibility to keep 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 Conflict may be eligible for benefits under the War Orphans Educational Assistance Act (PL 634). Write the nearest Veterans Administration regional office for additional information.

The Alabama G.I. and Dependents Education Benefit Act grants tuition assistance to eligible veterans, their children, widows and/or 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.

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, or to the Director of Vocational Rehabilitation, Room 416, State Office Building, Montgomery, Alabama, 36104.

Miscellaneous

Many businesses and industries provide tuition assistance to employees attending UAH. An employed student may wish to 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 Financial Aids and Placement Office.
Academic Advisement and Information Center

Located in Room 114 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 less than thirty semester hours of course work) are given first priority in requesting the services of advisers. They are also required to visit the Center at least once per 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. The chairman of the Lower Division of the School of Nursing, working in cooperation with the Center, validates the schedules of freshmen nursing students in Room 110 of Morton Hall.

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

Office of Counseling and Testing

Counseling Services
This Office offers assistance in numerous areas to all UAH students. Its staff works with persons experiencing indecision related to career or curriculum, with students having academic problems, with individuals having personal problems, and with students who feel an occasional need for someone with whom they can talk. All discussions in a counseling relationship are held in strict confidence.
Testing Services
The tests administered by the Office of Counseling and Testing serve four major functions: individual counseling, admissions, placement, and credit by examination. Tests designed for use in individual counseling or in career-related decisions are administered at no charge and provide the student with information about individual interests, aptitudes, abilities, and personality characteristics. The tests used for admissions, credit by examination, and placement administered through this office are: the American College Testing (ACT) Program, the Miller Analogies Test (MAT), the Graduate Record Examination (GRE), the Medical College Admissions Test (MCAT), the National Teacher Examinations (NTE), the College Level Examination Program (CLEP), the General Educational Development (GED) Testing Program, the National Engineering Aptitude Search (NEAS), and the foreign language and chemistry placement tests.

Tutoring Services
Tutoring services are coordinated through the Office of Counseling and Testing in conjunction with 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 Office of Counseling and Testing. Additional tutoring is available through the SGA subsidy program which pays one half of any tutoring costs. Students wishing to work as tutors are invited to seek approval by the chairman of the department which he will assist. These tutors will also be used to meet the needs of elementary and high school students seeking tutoring. In addition, short courses in study skills and reading improvement are offered.

Reference Literature
To supplement the above services, a collection of current resource materials on careers, occupations, graduate schools, undergraduate programs at other universities, study skills, and developmental reading is located in the office. Students are invited to browse at their leisure anytime during office hours (8:15 a.m. – 5:00 p.m., Monday through Friday). The materials may also be checked out for short periods of time.

UAH students and other members of the Huntsville community are encouraged to use the services of this Office. Come in or call the Office of Counseling and Testing, Room 108, Morton Hall, 895-6445.

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; which will make the University community as complete as possible; and which will broaden the student's interests and knowledge.

Each student enrolled at UAH is automatically a member of the Student Government Association. An SGA executive branch and a sixteen member legislature are responsible for carrying out the official business of the organization.

The SGA sponsors many student services such as life and health insurance, a store discount plan, a student charge card, special rates for community cultural events and a package of banking services from a local bank. The SGA works closely with all student activity programs, including Entertainment Series, Film Series, Free University, Symposium and Lecture Series, and the University Playhouse. The SGA provides students with an Ombudsman, legal counsel, a used textbook exchange, and a book club.

University Union

Union facilities are open to the entire University Community — students, faculty, and staff. Regular hours are: 8:00 a.m. - 10:30 p.m., Monday through Friday; and 1:00 p.m. - 10:30 p.m., Saturday and Sunday.

Lounges
A color TV lounge, a study lounge, and a card and game room are located on the second floor of the Union.

Meeting Rooms
The large Multipurpose Room on the first floor can accommodate up to 1,000 people, or can be divided into three smaller rooms.

Offices
All student offices (Student Government Association, Film Series, and exponent), as well as the Office of Intercollegiate Athletics, Union Activities and Intramurals, are located on the second floor.

Union Snack Bar
The University food service, located in the Union, provides convenient eating facilities and economical prices. It is open from 8:00 a.m. through 7:00 p.m., Monday - Thursday, and Friday from 8:00 a.m. to 5:00 p.m. A vending machine area is open during all Union hours.

Shower Facilities
Men's and women's shower facilities are located on the first floor next to the Multipurpose Room. Lockers are also available.

Student Sponsored Activities
Films, lectures, dances, and dramatic productions sponsored by the SGA are generally held in the Union.
Equipment
The Union provides facilities for individual sports and recreation, such as table tennis, bumper pool, etc. and equipment for physical workouts such as weight-lifting, trim-wheels, chinning bars, volleyballs, basketballs, etc. All equipment may be checked out in Room 207 of the Union.

Textbook and Supplies
The Book Nook, located in the University Union, stocks paperbacks for required and supplementary reading. In addition to school and art supplies, the Book Nook offers custom printed shirts, gift items, and class rings; it also handles the reservations for graduation announcements and the rental or purchase of academic regalia. As a service, the staff will special order any book in print.

The Textbook Store, located in Morton Hall, stocks, in addition to a large line of office and school supplies, the majority of books required for the courses taught at UAH. Booklists are available at the Book Nook and the Textbook Store three weeks before the beginning of classes for each new term.

Regular hours for both stores:
Monday - Thursday 9:00 A.M. - 6:00 P.M.
Friday 9:00 A.M. - 5:00 P.M.

Special hours for the first week of classes will be announced.

Student Organizations

Alpha Omega Fraternity
Alpha Omega Fraternity, founded during the spring of 1971, is affiliated with the national Alpha Tau Omega fraternity. Through brotherhood, the fraternity enriches the lives and educational experiences of its members and performs many services for the University community.

Baptist Student Union
The Baptist Student Union at The University of Alabama in Huntsville exists for the purpose of providing an outlet for Christian expression, discussion, and study. Membership in the BSU is open to any University student.

Biology Club
The object of the UAH Biology Club is to promote interest and research in the biological sciences. Any person enrolled as a full- or part-time student at UAH 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.
Le Cercle Francais
The purpose of Le Cercle Francais is to promote understanding and appreciation of the 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.

Christian Fellowship Group
The Christian Fellowship Group provides University students with additional opportunities for Christian worship, through Bible study, prayer, and Christian fellowship.

Circle K
Circle K, a service organization for men and women students, is sponsored by the Metropolitan Kiwanis Club. 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 purposes of this society are 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.

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 or desire Christian fellowship or counsel. Membership in ESF is open to any University student.

Gamma Xi
Gamma Xi is a service organization open to all women students and is affiliated with the national Gamma Sigma service organization. Gamma Xi functions at the University, community, and national levels, and members work at various service and fund-raising projects. Initiates must undergo a ten-week pledge period during which time they will work on special projects and attend the regular meetings which are held twice a month.
History Forum
The History Forum is an informal discussion 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 pre-selected issue of current interest. Programs are jointly presented by faculty members and student volunteers. Dues and profits from fund raising projects are utilized to equip the history seminar room at the University.

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.

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 Math 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 pre-medical and pre-dental 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 admissions 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.

Nursing Students’ Association
The purpose of the Nursing Students’ Association is to provide a means to aid nursing students in realizing professional goals and to provide interaction and fellowship among clinical and pre-clinical 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.

Slavic Club
The Slavic Club is for students who wish to further their understanding of Slavic
cultures. While 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.

Society for Advancement of Management (S.A.M.)
The Society for Advancement of Management (S.A.M.), an operating division of the American Management Associations, is the recognized national professional society of management people in industry, commerce, government and education. The UAH chapter, one of over 200 campus chapters of S.A.M., is dedicated to the development of tomorrow’s managers today. One important objective is to provide a bridge between the theoretical education of the university and the practical world of business by bringing together executives in business and students preparing to go into business. Students interested in the science and art of management are eligible for membership, regardless of their major.

The Society of Physics Students
The Society of Physics Students, designed solely for students, enables its members to participate in the physics community in a professional way. Students in SPS pay minimal national dues and receive Physics Today. Any interested student may join. Sigma Pi Sigma honorary society is a part of the SPS.

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 Research Institute Room C-5.

Veterans Club
Membership in the Veterans Club is open to all University student veterans. The Club works closely with the University’s Veteran Affairs Office in compilation and dissemination of all veterans information and in development and coordination of numerous programs designed to assist veterans on both a group and individual basis.

Young Democrats
The UAH Young Democrats Club, an affiliate of the National Collegiate Young Democrats of America, provides an outlet through which University students may become involved in the Democratic party. Past activities have included such events as symposia, meetings with local leaders, and sponsoring of a rally on campus.

Additional information about student organizations and a current list of club officers may be obtained from the Office of the Director of the Division of Student Affairs.
Academic Honor Societies

Alpha Lambda Delta
The UAH chapter of Alpha Lambda Delta, national scholastic honor society for freshman women, was installed in the fall of 1974. The purposes of the society are to encourage superior scholarship attainment among women in their first year in institutions of higher education, to promote intelligent being and a continued high standard of learning and to assist women students in recognizing and developing meaningful goals for their unique roles in society. To become a member, a student must earn a scholastic average of 2.5 during her first, second or third quarter of enrollment.

Honor Society in Nursing
The purposes of this society are to recognize superior achievement, recognize the development of leadership qualities, foster high professional standards, encourage creative work, and strengthen commitment to the ideals and purposes of the profession. This organization is the forerunner for a Sigma Theta Tau chapter, for which the petition has been submitted.

Humanities and Behavioral Sciences Honorary
The Humanities and Behavioral Sciences Honorary is a school level honorary for students majoring in one of the disciplines of the School of Humanities and Behavioral Sciences. The purpose of this Honorary is to promote, encourage, and maintain academic excellence within 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 each other and with the academic community of the University. 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 H&BS faculty.

Kappa Pi
The UAH Chapter of Kappa Pi, international college art honorary fraternity, is Epsilon Tau. This chapter 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 colleges and universities; 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 chapter 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 UAH faculty and staff members are actively involved in the Huntsville Field 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 in order to acquire a chapter of Phi Kappa Phi, an institution provide the atmosphere conducive to academic excellence.

Sigma Pi Sigma
The Sigma Pi Sigma Honorary Society operates within the Society of Physics Students. Membership in this fraternity is based on general scholarship. An overall QPA of 2.0 and a QPA of 2.2 in at least 15 hours in physics is required for membership in Sigma Pi Sigma.

Sigma Xi Club
The UAH Sigma Xi Club was formed to encourage and promote the activities of the Society of the Sigma Xi, an honorary organization devoted to the encouragement of original investigations in the pure and applied sciences. Membership in the UAH Club is restricted to members and associate members of the Society of the Sigma Xi and to certain other persons not members of the Society but who in view of their published research and professional standing would be considered as qualified for Society membership.

Future Organizations
The University is making a concerted effort to obtain charters from several other nationally recognized societies such as Alpha Kappa Delta (sociology honor society), Alpha Epsilon Delta (pre-medical, pre-dental honor society), Phi Eta Sigma (freshman men's honorary), Mortar Board, and Omicron Delta Kappa.

Cultural and Entertainment Programs
The University Arts Series
The University Arts Series, jointly sponsored by the SGA and the UAH faculty and administration, presents performances and residency programs to stimulate the cultural interests of the students and the University Community. Students are
admitted free to events by picking up a ticket at the UAH Book Nook in advance of each event. An additional half-priced "date" ticket for each event may be purchased by all students at UAH. Additionally, UAH students may attend, without charge, various cultural events in Huntsville throughout the school year. Information concerning these many opportunities is available at the SGA office in the University Union.

**UAH Film Series**
The UAH Film Series, free to UAH students, shows art, foreign, contemporary and classic movies monthly. 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.

**The UAH Symposium and Lecture Series**
The UAH 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 Symposium and Lecture Series.

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

**The University Playhouse**
The University Playhouse is a student operated group that presents theatrical productions each term. University Playhouse is open to any member of the University community with an interest in the theatre. Each year a broad selection of plays has been presented, including "The Fantasticks", "Blithe Spirit" and "Boys in the Band".

**Intercollegiate Athletics**

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

**Basketball**
The UAH Basketball Team participated in its first full varsity schedule during the 1973-74 season. The Chargers play a conference schedule as well as games with non-conference teams from throughout the Southeast. The 1974-75 schedule included such teams as University of South Alabama, University of New Orleans, Jacksonville State University and West Florida.
Rowing
Rowing is the oldest club sport at UAH. The Rowing team is a charter member of the Southern Intercollegiate Rowing Association (SIRA) and the National Association of Amateur Oarsman (NAAO) and competes against crews from such schools as Rollins College, Tampa University, and Jacksonville University.

The UAH Crew also participates in the following major regattas: Miami, President's Cup, and the Dad Vail (small college championship). The 1972-73 lightweight four-oared crew team was awarded the Doc Bradley Trophy, symbol of the national small college lightweight championship.

Rugby
The UAH Rugby Football Club began functioning as a club sport in the fall of 1974. The 1974-75 schedule included such teams as Vanderbilt University.

Soccer
In its fourth year of competition, the UAH Soccer Team has compiled an outstanding 37-8-5 record against such teams as Vanderbilt University, LSU, Georgia Tech, and the University of Tennessee. The soccer team is the defending champion of the Rocket City Soccer Classic and winner of the Southeastern Soccer Classic.

Intramural Athletics
The aim of intramural athletics is to provide an opportunity for all students to enjoy satisfying physical and competitive activities. The philosophy of intramural activities at UAH is based on the concept that students should have freedom of choice, equality of opportunity, 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. These include basketball, flag football, softball, table tennis, tennis, and volleyball. Tournaments in bridge, bumper pool, chess, and "fossball" are also scheduled.

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 required. By audition with conductor.

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 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. By audition with conductor.

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

Huntsville Symphony Orchestra
The Huntsville Symphony Orchestra, a semi-professional blend of university and community talent, prepares six formal concerts each year. Four international artists perform with each annual concert series. Rehearses Monday and Friday from 7:30 to 10:00 p.m. By audition with conductor.

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

Summer Band
The Summer Band provides an opportunity to rehearse and perform band music of a somewhat lighter nature. By audition with conductor.
Pep Band
The Pep Band reflects the spirit and excitement of a growing university. This informal aggregation plays at UAH home basketball games. No audition necessary. Non-credit.

Student Publications
The official student newspaper, exponent, is edited and managed by UAH students with the advice and general direction of the joint student-faculty Publications Board. All UAH students are eligible for staff membership. The editor is elected by the student body.

The Student Government Association occasionally publishes a pamphlet concerning new programs and services provided for the student body.
Courses of Instructions

The courses to be offered each term will be announced in printed schedules well in advance of the term. There is no assurance that a particular course will be scheduled in any given term or year.

Courses are described under the sections of the various schools.

Course Numbering System

<table>
<thead>
<tr>
<th>Range of Numbers</th>
<th>Year Student Normally Takes Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>001-099</td>
<td>Refresher (non-credit)</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>Semester</th>
<th>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>
Conduct

A student enrolling in the University assumes an obligation to conduct himself in a manner compatible with the University’s function 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 federal, state, and local laws. Laws having to do with alcoholic beverages, drugs, narcotics, gambling, fireworks, and the use of state property are particularly applicable to a university.

Alabama laws are explicit with regard to alcoholic beverages. It is unlawful for any person to exhibit or display an alcoholic beverage (including beer and wine) or to consume an alcoholic beverage in any public place except in a duly-licensed restaurant, hotel, or private club. It is unlawful for a person under the age of 21 to consume alcoholic beverages.

The possession and/or sale of drugs and narcotics is closely regulated by both federal and state laws. Gambling is not legally permissible under the existing state laws. The Huntsville City Code specifically prohibits the use of fireworks (excepting "dipsticks" and sparklers) within the city limits of Huntsville. State law also prohibits the misuse and/or abuse of state property.

All members of the University community are urged to report infractions of these laws to the campus security office. After consultation with administrative officials, appropriate action will be taken through disciplinary action by the University and/or local law enforcement agencies.

Academic Loads

A full-time undergraduate student is one who is enrolled in courses totaling at least 8 semester hours per 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 non-credit and audit courses.) A part-time undergraduate student is one who is enrolled in courses totaling 1-7 semester hours. 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 will be given much responsibility for independent study. Careful budgeting of time will be 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 20 hours per week constitutes an average work load that will allow needed time for adequate study.

For students who for financial reasons need to be employed to a greater extent, a reduction in course load is suggested. From the standpoint of allowing sufficient
time for the amount and quality of work necessary to meet a student's academic goals, fully employed undergraduate students normally will find that they should take no more than two courses.

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

**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 wishing to take German, French, Spanish or Russian must take an advanced language examination provided he has had two or more years of the language in question in high school. Students who have had less than two years of a language in high school or are taking a language for the first time do not take language placement tests. A student who has taken no previous college chemistry courses must take the chemistry placement examination before enrolling in chemistry classes at UAH.

A student is required to pursue placement procedures only with regard to the aforementioned academic areas and conditions. He may, of course, enroll in courses which do not require placement.

Placement tests are scheduled once each term (see the UAH calendar). Students wishing to take these tests should register in the Office of Counseling and Testing at least three days before the tests are to be given. They will be notified at the time of the exams as to when they can expect to receive the results of the tests and course assignments.

Students who have already taken the ACT exam and who have not been assigned to English and mathematics sections must request placement through the Office of Counseling and Testing. All course assignments resulting from placement requests must be completed before regular registration occurs for the term in which the student wishes to take said courses.

Charges for examination are: ACT--$8.50; Chemistry, Spanish, German, Russian and French--$3.00 each. Students are charged only for the tests they take.

**College Level Examination Program**

CLEP tests are offered in five general areas and 35 specific subject areas. 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-History. At UAH a student may obtain up to one-fourth of his degree (32 semester hours) by examination.
General Examinations

At UAH the five general tests are awarded "elective credit" only. The student may be awarded 6 hours elective credit per examination. To achieve credit for any of the general tests, the student must score between 549 and 649 for a grade of "B" or between 650 and 800 for a grade of "A". No credit is awarded for scores below 549.

Subject Examinations

Most subject tests are assigned grades on the basis of the score attained. These grades are counted as part of the student's quality point average. Some departments may request that subject tests passed be recorded only as hours completed. The CLEP subject tests which UAH will accept as substitutes for required courses are listed below.

<table>
<thead>
<tr>
<th>Subject</th>
<th>For</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Government (with essay)</td>
<td>PSC 101</td>
</tr>
<tr>
<td>50–54 = C</td>
<td></td>
</tr>
<tr>
<td>55–59 = B</td>
<td></td>
</tr>
<tr>
<td>60–80 = A</td>
<td></td>
</tr>
<tr>
<td>American History (with essay)</td>
<td>HY 221, 222</td>
</tr>
<tr>
<td>53–58 = B</td>
<td></td>
</tr>
<tr>
<td>59–80 = A</td>
<td></td>
</tr>
<tr>
<td>*Analysis and Interpretation of Literature</td>
<td>EH 101, 102</td>
</tr>
<tr>
<td>(with essay)</td>
<td></td>
</tr>
<tr>
<td>*English Composition (composite score)</td>
<td></td>
</tr>
<tr>
<td>60–62 = B</td>
<td></td>
</tr>
<tr>
<td>63–80 = A</td>
<td></td>
</tr>
<tr>
<td>Elementary Computer Programming — Fortran IV</td>
<td>EG 196</td>
</tr>
<tr>
<td>54–58 = B</td>
<td></td>
</tr>
<tr>
<td>59–80 = A</td>
<td></td>
</tr>
<tr>
<td>General Chemistry (must first take placement exam)</td>
<td>CH 121, 123, 125, 126</td>
</tr>
<tr>
<td>48–52 = C</td>
<td></td>
</tr>
<tr>
<td>53–61 = B</td>
<td></td>
</tr>
<tr>
<td>62–80 = A</td>
<td></td>
</tr>
<tr>
<td>Introductory Accounting</td>
<td>AC 111, 112</td>
</tr>
<tr>
<td>57–62 = B</td>
<td></td>
</tr>
<tr>
<td>63–80 = A</td>
<td></td>
</tr>
<tr>
<td>Introductory Business Law</td>
<td>BUS 321</td>
</tr>
<tr>
<td>57–62 = B</td>
<td></td>
</tr>
<tr>
<td>63–80 = A</td>
<td></td>
</tr>
<tr>
<td>Introductory Economics</td>
<td>EC 142, 143</td>
</tr>
<tr>
<td>54–61 = B</td>
<td></td>
</tr>
<tr>
<td>62–80 = A</td>
<td></td>
</tr>
</tbody>
</table>
Introductory Sociology  
54–60 = B  
61–80 = A  

Statistics  
57–80 = A  

Western Civilization (with essay)  
56–62 = B  
63–80 = A  

*The English Department requires a composite score of 60 on the two examinations, Analysis and Interpretation of Literature (with essay) and English Composition, in order to receive 6 hours credit for English 101 and 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. One retest is allowed by permission of ETS on the General Examination. Subject Examinations may not be repeated within a year.

Some departments offer credit by examination on tests constructed by the department. The departments in which you may challenge courses are listed below.

**UAH Credit By Department Examination**

<table>
<thead>
<tr>
<th>Department</th>
<th>Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Science</td>
<td>All Courses</td>
</tr>
<tr>
<td>Mathematics</td>
<td>MA 104, 105, 133, 143, 153, 154, 233</td>
</tr>
<tr>
<td>Modern Languages</td>
<td>Contact Dr. O’Neal</td>
</tr>
<tr>
<td></td>
<td>Department Chairman</td>
</tr>
<tr>
<td>Music</td>
<td>MU 101, 102, 103, 110, 201, 202, 311, 312</td>
</tr>
<tr>
<td>Nursing</td>
<td>Contact Ruth Merrill</td>
</tr>
<tr>
<td></td>
<td>Nursing Advisor</td>
</tr>
<tr>
<td>Philosophy</td>
<td>PHL 102, 220</td>
</tr>
</tbody>
</table>

Credit can be given only if examinations were taken before entering college or during the first term in college, providing the student has not been enrolled in a comparable course for more than one week.

Credit by CLEP examination is not allowed unless the appropriate academic department has accepted the CLEP test for use by the University. In other cases credit by examination is not allowed (1) when a student has successfully completed a course at a higher level than the one being challenged, (2) to raise a passing grade or to remove failures already received in a course, or (3) to satisfy the residence requirement for graduation.
For further information concerning CLEP contact the Office of Counseling and Testing, Room 108, Morton Hall; Telephone 895-6445.

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 prior 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

Once 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 cancelled 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," a Change of Course Form must be submitted prior to 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 late 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.

How to Withdraw

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 the circumstances under which withdrawal becomes necessary, a student must carry out withdrawal procedures as follows:

1. A written request for withdrawal must be presented by the student to the Office of Admissions and Records. A receipt for each such request will be issued, and 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, if it becomes necessary for a student to withdraw from the University, he should inform his instructor(s) directly and each instructor will assign an appropriate grade on the official grade sheet at the end of the term. The instructor may be able to assign a final grade on the basis of work done to date, or he may wish to assign an I, giving the student additional time to complete course requirements.

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 a student is charged with hours attempted each time he registers for a credit course and receives a grade other than W, S, or U.

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 by all students 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 prior arrangement with the course instructor (except in extenuating circumstances) will be classified unexcused and a failing grade in the course will be assigned.
Grades

<table>
<thead>
<tr>
<th>Grades</th>
<th>Quality Points/Semester Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3</td>
</tr>
<tr>
<td>B</td>
<td>2</td>
</tr>
<tr>
<td>C</td>
<td>1</td>
</tr>
<tr>
<td>D</td>
<td>0</td>
</tr>
<tr>
<td>F</td>
<td>0</td>
</tr>
</tbody>
</table>

Incomplete.
Assigned by the instructor when a student has failed to satisfy some minor requirements 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.

Absent 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 of the term of next regular enrollment of the student. (See section on Examinations and UAH calendar.)

Withdrawal
Assigned by the Office of Admissions and Records when a student withdraws from a course with passing work. (See section on Withdrawals.)

Withdrawal Failing
Assigned by the Office of Admissions and Records when a student withdraws from a course with failing work. (See section on Withdrawals.)

A grade of S (satisfactory) or U (unsatisfactory) is assigned in all non-credit courses and in some specified credit courses.

A grade of P (passing) or F (failing) is assigned in some courses. (See following section on 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 and unless written notification to the contrary is submitted by the student to the Office of Admissions and Records prior to the final examination period.

Quality Point Average

The quality point average 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, S, or U is assigned are not included.

Honors

Honor Scholar

An undergraduate student earning 8 or more semester hours in a term with a quality point average of 2.50-3.00 is distinguished by being identified as an Honor Scholar. A student who takes less than 8 semester hours per term and establishes a quality point average of 2.50-3.00 will, at the end of the term in which at least 8 semester hours are completed, be designated as an Honor Scholar.

Scholar

An undergraduate student earning 8 or more semester hours in a term with a quality point average 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 per term and establishes a quality point average of 2.00-2.49 will, at the end of the term in which at least 8 semester hours are completed, have his name placed on the list of Scholars.

For these purposes, 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 quality point average of 2.20-2.49 will be graduated With Honor; a student with a quality point average of 2.50-2.79 will be graduated With High Honor; a student with a quality point average of 2.80-3.00 will be graduated With Highest Honor.

To be eligible for consideration for honors, a student must complete at least 25% of his total degree requirements at UAH. A student's overall point average as well as
his quality point average on work taken at UAH will be computed and both computations must fall within the specified range.

Honors 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 quality point average 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. At the time of review, if his quality point average is less than 1.0, he is placed on scholastic probation.

After the first evaluation, a full-time student’s record is examined at the end of each term. In the case of a part-time student, the record is reviewed at the end of the term in which an accumulated total of at least 8 semester hours has been attempted.

At the specified times of review, a student will be placed on scholastic probation if his overall quality point average 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 only is less than 1.0 (C).

<table>
<thead>
<tr>
<th>If Overall Quality Point Average Is</th>
<th>Quality Point Average*</th>
<th>Quality Point Deficiency**</th>
<th>Action Indicated</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 or higher</td>
<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>Less than 1.0 and</td>
<td>More than 7</td>
<td>Suspension</td>
</tr>
</tbody>
</table>

*On last block of work prior to review
**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.

When a student within the University of Alabama system is suspended the second time for scholastic reasons, he is permanently disqualified for readmission.

A student whose academic status is indeterminate due to grades of 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 section on Grades and Quality Points.) 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 at UAH and desire to change to a program in another school may petition to do so by making application at the Office of Admissions and Records. Counseling 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 AOC at the Office of Admissions and Records. If a student subsequently decides to change to a different major within the same school, he should contact the department of the new major for directions on procedure to follow. (See also Change of School, above.)

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 AOC 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 AOC 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 quality point average; a grade of F will be counted in a student’s quality point average.

A student may initiate the P-F option by making 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, instructors’ grade sheets will reflect the actual grade and the student may be informed of the regular grade upon request.

Visiting Student Program

A cooperative arrangement exists with Alabama A & M University, Athens 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 register for 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 per 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 advisor 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.

Application for Graduation

Candidates for graduation must file their applications at least three months prior to the time requirements are expected to be completed. Application forms may be obtained at the Office of Admissions and Records.

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 supporting cluster, etc.).

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% 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 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 $2.00 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 Non-Resident Credit**

Persons interested in taking correspondence study courses through The University of Alabama in Tuscaloosa may write The University of Alabama, Tuscaloosa, P. O. Box 2987, University, Alabama 35486.

Up to 25% 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, professional certificate programs, and extension credit.

**Undergraduate Schools' Majors and Degrees**

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

**School of Humanities and Behavioral Sciences**

Areas of study in which majors are currently offered are:

- Art
- Business (options in Accounting, Finance, Management)
- Criminal Justice
- Economics
- English
- History
- French
- German
- Music
- Political Science
- Psychology
- Slavic Studies
- Sociology
Other areas with course offerings are: Education, Philosophy, Russian, Spanish, Speech, Physical Education, and Journalism.

School of Science and Engineering

Areas of study in which majors are currently offered are:

Biology
Chemistry
Computer Engineering
Electrical Engineering
Structural Engineering
Environmental Engineering

Mechanical Engineering
Industrial and Systems Engineering
Mathematics
Mathematics Education
Physics

Courses are also offered in Computer Sciences, Environmental Sciences, Natural Science, and Statistics.

School of Nursing

All majors receive instruction in general nursing practice in a clinical setting; and, through a selected minor or secondary area of concentration, may pursue study that will enable them to move toward unique personal and professional goals. Able students may progress to advanced study as the general education requirements prepare them for graduate programs.

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.

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, English, German, History, Mathematics, Mathematics Education, Music, Political Science, Psychology, Slavic Studies, Sociology

Bachelor of Science:
Biology, Chemistry, Mathematics, Mathematics Education, Physics

Bachelor of Science in Business Administration:
Accounting, Finance, Management

Bachelor of Science in Engineering:
Unified Programs with Professional Specializations
Bachelor of Science in Nursing:
Unified Professional Program with Selected Minor or Secondary Area of Concentration

Medical Technology

A program in Medical Technology is available through the unified effort of UAH and the Huntsville Cooperative School of Medical Technology.

A student interested in Medical Technology may elect one of the suggested curricula leading to the B.S. degree. (See Biology Curriculum VII or Chemistry Curriculum VI.) Upon the completion of all other University requirements, a maximum of 29 semester hours of elective credit, earned through the Medical Technology internship, may be applied toward the B.S. degree at UAH.

This program is designed to meet the requirements for certification by the Registry for Medical Technologists of the American Association of Clinical Pathologists.

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 areas 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 fully prepared student may elect a cluster of environmental science courses and receive a certificate for completion of this program while completing the requirements for the bachelors degree in mathematics, science, or engineering. The cluster 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.

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 Engineering degree, 129 semester hours; and for the Bachelor of Arts in music, 134 semester hours. A minimum of 25% 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 courses (numbered 300 or above) must be completed at UAH in a student’s AOC (6 hours in his major and 6 hours in his cluster). (AOC is defined on page 50.) A minimum of 30% of the total degree requirements must be taken in courses numbered 300 or above.

2. The maximum amount of correspondence or extension credit allowed towards a bachelor's degree is 25% of the degree requirements.

3. An overall average of C is required for all courses taken at: (a) all institutions; (b) UAH; (c) UAH and overall in the major; and (d) UAH and overall in supporting cluster of AOC.

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

1. 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 languages. 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 cluster 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 & BEHAVIORAL SCIENCES

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Composition</td>
<td>6</td>
</tr>
<tr>
<td>Survey of English Literature</td>
<td>6</td>
</tr>
<tr>
<td>Origins and Development of the Contemporary World</td>
<td>6</td>
</tr>
<tr>
<td>Economics, Political Science, Philosophy, Psychology, or Sociology</td>
<td>6</td>
</tr>
</tbody>
</table>

One discipline
If major is economics or psychology, the social sciences requirement should be taken in one of the other disciplines.

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign Language</td>
<td>6-12</td>
</tr>
</tbody>
</table>

(See section entitled Modern Foreign Languages.)
SCIENCE – MATHEMATICS

(Laboratory sciences consist of courses in biology, chemistry, environmental sciences, natural science, and physics.)

A student may select any of the following options: (Caution – For teacher certification, both biological and physical sciences must be included. See section on certification requirements.)

a. 6 hours mathematics; 8 hours one laboratory science

b. 8 hours in each of two laboratory sciences

c. 3 hours mathematics; 8 hours one laboratory science, 4 hours another laboratory science

d. 3 hours mathematics; 12 hours natural science sequence (NS 111, 112, 113)

General Education Requirements
for the Bachelor of Science Degree

HUMANITIES & BEHAVIORAL SCIENCES

<table>
<thead>
<tr>
<th>Semester Hours</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>English Composition</td>
</tr>
<tr>
<td>6</td>
<td>Survey of English Literature</td>
</tr>
<tr>
<td>6</td>
<td>Origins and Development of the Contemporary World</td>
</tr>
<tr>
<td>6</td>
<td>Economics, Political Science, Psychology, Philosophy, or Sociology (one discipline)</td>
</tr>
<tr>
<td>6-12</td>
<td>Foreign Language (See section on Modern Foreign Languages)</td>
</tr>
<tr>
<td></td>
<td>SCIENCE – MATHEMATICS</td>
</tr>
</tbody>
</table>

8 hours in each of two sciences selected from biology, chemistry, or physics ........................................ 16
Mathematics .................................................................. 9

To meet the general education requirements for the Bachelor of Science degree, a student will take 49-61 semester hours.
II. The Area of Concentration (AOC)

1. The Area of Concentration (AOC) is the part of the student’s undergraduate degree program comprised of the major and cluster. The upper limit on required hours in the AOC is 64 (except music department).

2. 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. A suggested minimum number of hours to constitute a major is 36. Fifteen hours must be taken in upper level courses in the major. A composite major may be developed from courses in more than one discipline. Guidelines for such majors must be identified by the departments involved and approved by the Dean of Faculty; explicit course programs are subject to approval by all disciplines concerned and must meet standards as set forth above.

3. A cluster may be defined in two ways:
   a. A group of courses in one 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. Ideally, such a cluster is an interdisciplinary development of one aspect of the major, or
   b. A group of courses from one or more disciplines which bear a logically defensible relationship to one another, separate from the thrust of the major, designed to give the student breadth and some depth in a secondary area.
   c. In either case, the minimum number of hours in the cluster is 21 (9 upper level if the cluster is composite; 6 upper level if the cluster is a single discipline.)

4. The AOC Form is a document prepared cooperatively by a student and a responsible faculty advisor. Academic departments and/or schools must assume responsibility for insuring that each of their students has an opportunity to develop an AOC Form before the end of the student’s sophomore year.

III. Elective Courses

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.

IV. Requirements for Teacher Certification

1. Secondary Education: These courses are specified electives which a student may choose in order to qualify for secondary certification along with his bachelor’s degree.
2. Elementary Education: A student seeking elementary certification chooses the prescribed courses as a supporting cluster; this group of courses then becomes an integral part of the AOC and subject to the prescriptions thereof.

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

Pre-Law Programs

Many schools of law require applicants to obtain a bachelor’s degree as a prerequisite for admission. Interested students should examine the requirements of the specified law school which they wish to attend for identification of the needed curriculum.

The University of Alabama School of Law does not prescribe any particular curriculum of pre-law study, but normally requires as a condition for admission that the applicant has successfully completed the following undergraduate work or its equivalent:

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Composition</td>
<td>6</td>
</tr>
<tr>
<td>English or American Literature</td>
<td>6</td>
</tr>
<tr>
<td>American History</td>
<td>6</td>
</tr>
<tr>
<td>Political Science (including U.S. Government)</td>
<td>6</td>
</tr>
<tr>
<td>Principles of Economics</td>
<td>6</td>
</tr>
</tbody>
</table>

Additional recommended courses are philosophy, psychology, sociology, foreign languages, and accounting. Since other requirements must be met, completion of these courses does not insure admission.

Pre-Medical and Pre-Dental 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 great, 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 year 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 programs of The University of Alabama in Huntsville School of Primary Medical Care — a component of the tri-campus University of Alabama System Medical Education Program — are described in the School of Primary Medical Care section of this catalog.

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

<table>
<thead>
<tr>
<th>Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Biology</td>
<td>8</td>
</tr>
<tr>
<td>2. Inorganic chemistry (including qualitative analysis)</td>
<td>8</td>
</tr>
<tr>
<td>3. Organic chemistry</td>
<td>8</td>
</tr>
<tr>
<td>4. Quantitative analysis</td>
<td>4</td>
</tr>
<tr>
<td>5. Physics (including laboratory)</td>
<td>8</td>
</tr>
<tr>
<td>6. College algebra and trigonometry</td>
<td>6</td>
</tr>
<tr>
<td>7. Thirty semester hours of non-science 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.</td>
<td>30</td>
</tr>
<tr>
<td>8. The completion of a minimum of 90 semester hours of collegiate work.</td>
<td></td>
</tr>
</tbody>
</table>
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 pre-professional health programs (pre-dentistry, pre-medicine, pre-optometry, pre-veterinarian medicine) are encouraged to contact the Pre-professional Advisor by calling the Office of the Dean, School of Science and Engineering.
School of Humanities and Behavioral Sciences

Dean: Jon G. Rogers, Associate Professor of Psychology

The humanities and the behavioral sciences contribute substantially to the understanding of man's relation to himself, to his fellow man, 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 most successfully. 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 and has aspired to be.

The behavioral sciences encompass that knowledge which 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 economics and business, political science, psychology, and sociology, are designed to perform both roles. Since these disciplines are concerned with the social milieu which is both possible and desirable, the approach is scientific in terms of assumptions and methods, but humanistic in its implications.

Undergraduate Degrees and Study

Within the School of Humanities and Behavioral Sciences a student may earn a Bachelor of Arts degree or Bachelor of Science in Business Administration degree. Each student must, no later than the close of his sophomore year, declare an area of concentration (AOC). This AOC must include a major and a supporting cluster of courses. The major must be chosen from one of the following disciplines: accounting, art, criminal justice, economics, English, finance, French, German, history, management science, music, political science, psychology, Slavic studies, or sociology. In addition to these majors, courses are offered in education, Russian,
Spanish, philosophy, speech, physical education, and journalism. Students majoring in the behavioral sciences also may choose a supporting cluster of courses in criminal justice, which is offered through the Division of Continuous Education.

The supporting cluster must include one of the following variations. (Students planning a cluster in music, please refer to Department of Music section in catalog):

1. An established cluster of courses drawn from one department offering a major at The University of Alabama in Huntsville. The cluster must include a minimum of 21 semester hours as prescribed by the department, at least six of which must be numbered 300 or above;

2. A cluster drawn from one discipline without an established major, including 21 semester hours of courses of which at least six hours are numbered 300 or above; or

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

Any cluster chosen by a student is subject to the approval of (1) the student's major department; and (2) the Dean of the School. A cluster or minor may require consultation with the department or departments involved. Each major department has developed appropriate areas of concentration designed to provide a sound curriculum in various areas of interest; however, a student who wishes to deviate from any of the standard AOC's may work out an individual program with advice of his major department.

Graduate Programs

Two interdisciplinary programs, one awarding a Master of Administrative Science degree and one awarding a Master of Arts degree in developmental learning and a Master of Arts degree in English are also offered. Requirements for these degrees and course descriptions are listed in this section.

Administrative Science

A Master's Degree Program

Associate Professors: Mirakhor, Olsen (director); Assistant Professors: Hays, Wu; Adjunct Professor: McDaniel; Adjunct Associate Professor: G.C. Bucher; Adjunct Assistant Professor: Dowdy

An interdisciplinary graduate degree program in administrative science designed for practicing administrators is offered at The University of Alabama in Huntsville. The basic premise of the program is that administration is a necessary activity in all organizations and that it encompasses a common body of knowledge. The program requires 21 semester hours in a core curriculum and 12 hours in a specialized
option. Options are available in administrative science, economics, public administration, operations research, industrial and systems engineering, and computer science. In addition, every effort will be made to allow options tailored to the career needs of the individual.

The program is designed primarily for mid-career executives and early-career executives-to-be. While no specific undergraduate social science prerequisites will be required as a condition for admission to the core program, students who wish to take certain options will have to meet the prerequisites in those courses or have permission from the instructor for a waiver. The program is thought of as professional in character; therefore, no thesis is required but the student must show by submitting a research paper, in one or more of the courses, his capacity for analytical writing.

To be admitted to the graduate program in administrative science, a student must meet the general requirements to Graduate School as indicated on page 230 of this catalog.

Administrative Science (AS)

CORE CURRICULUM

The following core courses (AS 621 through AS 627) are required of all students enrolled in the graduate program in administrative science.

621 Introduction to Administrative Science 3 hrs.
Intended primarily as an introduction to administrative science for students who have not taken administrative-science type courses in their undergraduate work. Topics covered will include the principles of organizational structure, planning and forecasting, directing, controlling, staffing, decision-making, communication, and how these relate to each other in a comprehensive sense. This introductory material will prepare the student for higher level administrative science courses covering these and related topics in greater depth and detail.

622 Human Behavior in Organization 3 hrs.
The behavior of individuals and groups in an organizational context. Considers the organization as a continuing social system. Analyzes the problems of motivation and incentives. Looks at the problem of organizational communication and the blockages thereto. In a general way, it deals with the problem of the selection, training, promotion and severance of organizational members.

623 Complex Organizations 3 hrs.
Study of the basic theories of organizations and organizational structures. Introduces the student to the study of organizations by considering them from the perspectives of management, psychology, sociology, political science and economics. Organizations as groups of people and as systems existing in multiple environments are explored. Goals, resources, effectiveness, equilibrium and change are analyzed as they relate to organizations. The administrative's relationships with the organization are studied. Organization research and assessment are emphasized.

624 Organizational Planning, Direction, Coordination and Control 3 hrs.
A study of the major administrative functions of planning, directing, coordinating and
controlling in an organizational setting. Forecasting and planning objectives and techniques are investigated. Different styles of directing and their effectiveness are evaluated. Coordination and control methods and their purposes are studied. The relationships between planning, direction, coordination and control are identified and discussed.

625 Labor Relations and the External Environment  3 hrs.
A survey of the relationships between management and organized labor and between organizations and the world outside their confines. A review of the development of organized labor in the U.S. and major legislation affecting relations between management and labor. The collective bargaining process and administration of the resulting contract, as viewed from the standpoint of management and labor, will be covered. Evaluation of the effects of the social, economic, political and technological environments on labor relations and upon the organization's relations with the external environment. The impact of the public and the news media upon management actions will be considered.

626 Business Decision Economics  3 hrs.
Introduction to the economic and financial problems of business, the decision-making techniques for solving these problems. Emphasizes practical management decision problems related to the use of organizational resources. Covers business objectives, demand, market structure, costs, cash flow and various economic decision techniques.

627 Quantitative and Research Methods in Administrative Science  3 hrs.
Introduction to the basic assumptions and techniques used in social science research. Designed to enable the student to envision various ways in which needed information can be obtained, evaluated and assessed. Introduces the student to probability and statistics, interviewing techniques, scaling, index numbers and index number construction, utilization of experimental design, parametric and non-parametric tests of hypothesis, estimation techniques and analysis of associations (regression and correlation).

ELECTIVE COURSES

628 Quantitative Methods in Management Science II  3 hrs.
Basic review of the scientific method of analysis applied to administrative-type situations. This course is intended to provide a better understanding of the quantitative techniques used for generating management information and for decision-making at the management level. Covers hypothesis testing, sampling procedures, distributions, data reduction techniques, simulation and statistical decision theory. Prerequisite: AS 627 or permission of instructor.

629 Leadership and Motivation  3 hrs.
An analysis of various authority and leadership styles and their effectiveness in different types and levels of organization. Evaluation of theories of personnel motivation and their practicability and effectiveness. Consideration is given to the critical role of effective communication in both leadership and motivation.

501 Industrial Sociology  3 hrs.
Historical development of production systems. Social interaction in the industrial setting, industry as a social system, industry as a social organization, power groupings in industry, industry and the community, industrial conflict. Same as Sociology 501.

631 Personnel Administration in Organizations  3 hrs.
A study of the purposes, functions, and processes of personnel administration through the examination of traditional as well as contemporary theories. The personnel administration needs of large, complex organizations in both the private and public sector are studied. Elements of a comprehensive personnel program are considered in relation to the total management of an organization.
632 Civil Systems Planning
3 hrs.
Analysis of currently used planning methods and predictive models to illustrate the values and dangers inherent in their application to public systems. As more attention is directed to social problems, new tools and methods are required. Information from economics, sociology, psychology, and political science must be integrated with the purely technical in solving these problems. Planning methods will be applied in terms of specific techniques and actual planning situations. There will be a mixture of classroom work and laboratory visits to community agencies.

633 Socio-Economic Consequences of Government Procurement
3 hrs.
This course will provide an analysis of the nature of Federal Government procurement (contracting); the Government's organization and procedures for managing the contractual system; 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.

650 Selected Research Topics
3 hrs.
Students who have completed their core curriculum with the consent of a member of the administrative science faculty, may take a course which involves research into a particular topic relevant to administrative science. This may be done individually or by a group of students. The resulting paper must be an original research contribution showing a research design and results meeting the highest standards of social science research.

Administrative Science Specialized Options Curriculum

The graduate program in administrative science requires 21 semester hours in a core curriculum and 12 hours in an option. Normally, a student will acquire 12 hours of credit in one of the following designated options. However, it is also possible for a student, with the approval of his advisor, to formulate a special option to fit his specific career requirements by selecting courses from more than one of the designated options. In each of the specialized options listed below, note that certain courses are identified as a required prerequisite course(s) while others may be selected as electives in a particular option.

Administrative Science Option:
Required: AS 629 and AS 501/SOC 501
Electives: AS 628, AS 631, AS 632, AS 633, AS 650

Computer Science Option:
Required: CS/EG 511
Electives: CS/EG 512, CS/EG 513, CS/EG 514, CS/EG 690, CS/EG 691

Economics Option:
Required: EC 510 (This course is a prerequisite to the following courses if the student was not an Economics undergraduate), EC 600, EC 610
Electives: EC 546, EC 564, EC 585, EC 620, EC 630, EC 640

Industrial & Systems Engineering Option:
Required: EG 525, EG 627
Electives: EG 523, EG 526, EG 621, EG 632, EG 633, EG 634
Operations Research Option:
Required: EG 525, EG 625
Electives: EG 527, EG 621, EG 629, EG 634, EG 635, EG 637

Public Administration Option:
Required: PA 512 and PA 515
Electives: PA 510, PA 560, PA 568, PA 591, PSC/PA 500

For more detailed information on the courses, see course descriptions provided under respective departments.

Art

Associate Professors: Bayer (chairman), Dempsey, Pope; Assistant Professor: McCabe

The Department of Art 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 career in art, and for cultural enrichment. To enable UAH visual art graduates to compete with graduates from institutions offering the Bachelor of Fine Arts degree, the UAH art program provides both depth and breadth in studio course offerings.

All of the studio courses require supplies to be secured by the student with substantial amounts required in some of the courses. Those students who have funded support should include an amount for supplies in their request. Since some studio courses do not require textbooks, the net 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. This should be done in advance of initial registration. Advanced placement in regard to UAH art courses will be determined by the art faculty. Candidates for a degree with a specialty in art who transfer to UAH must take at least 12 semester hours of art courses numbered 300 or above at UAH. A student having a cluster in art must take at least 8 semester hours of this work 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.

Opportunities for upper division specialization within the art degree program are offered in: art history, painting, communication graphics, sculpture, and art teacher
training. Communication graphics consists of courses in advertising layout, typographic and lettering design, commercial art, illustration, and film techniques such as animation. Painting includes courses in mixed media and film making.

Area of Concentration (AOC) with Art Major

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

The basic degree requirements include 9 semester hours of history of art (ARH 100, 101 and 102) in a foundation program of 18 (art history) or 25 (art studio) semester hours of courses in the lower division program; and upper division work of 19 (art studio) or 23 (art history) semester hours as detailed below.

Plan I Art Program

1. Major in Studio Specialties (painting, communication graphics, and sculpture)

   Lower Division Foundation Program (25 semester hours)
   Drawing, 6 hours (3 courses); design, 4 hours (2 courses); sculpture, 4 hours (2 courses); photography, 2 hours; and art history, 9 hours (100, 101 and 102).

   Upper Division (19 semester hours)
   Junior year - 6 hours (3 courses) in the major studio area (painting, communication graphics, or sculpture) at the 300 level; 7 hours consisting of 4 hours (2 courses at the 300 level in studio areas outside the major studio specialty), and art history, 3 hours (300 or 400 level).

   Senior year - 6 hours (3 courses) in the major studio area at the 400 level.

2. Major in Art History Specialty

   The art history major includes introductory courses in studio areas to provide insight into the creative experience.

   Lower Division Program (18 semester hours)
   a. 12 hours of art history (Art 100, 101, 102 and 3 additional hours in art history above the 100 level).
   b. 6 hours of studio (three courses, all at the 100 level) which include two of the four lower division studio areas (design, drawing, sculpture, and photography).
Upper Division (22 or 23 semester hours)
   a. Junior year — 9 hours in art history (3 courses at 300 level).
   b. Senior year — 9 hours in art history (3 courses, at least two of
      which are at the 400 level).
   c. 4 hours in studio (2 courses) one of which will be at the 300
      level, or 2 hours (one course) in studio and 3 hours in an
      approved culturally oriented course in the Humanities.

3. Major in Art with Teacher Certification

The programs for teacher certification available to art degree candidates offer
a wide range of qualification for teaching in Alabama elementary, middle,
secondary schools, or all three.

It is possible through different combinations of the various elements of these
programs, listed below, to achieve several distinct kinds and qualities of
employability in Alabama public and private schools.

It must be noted that:
   a. These general education requirements differ somewhat from
      those for other B.A. degrees.
   b. A student interested in these programs must acquaint himself
      with the Education Department section of the catalog. In that
      section he will find detailed lists of general education require-
      ments, professional courses, and much other information relevant
      to the programs outlined below.
   c. Different combinations of the following elements may be
      grouped into programs that best serve the individual needs of the
      degree candidate.

The three major programs are as follows:

Program 1:

Class B Secondary Certificate to Teach Art full time, and the cluster
subject part time, in grades 7 through 12.

General Education Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>English (EH 101, 102, 205, 206)</td>
<td>12</td>
</tr>
<tr>
<td>Speech</td>
<td>3</td>
</tr>
<tr>
<td>History (HY 101, 102)</td>
<td>6</td>
</tr>
<tr>
<td>Foreign Language</td>
<td>6 or 12</td>
</tr>
<tr>
<td>Social Sciences (one discipline)</td>
<td>6</td>
</tr>
<tr>
<td>Psychology</td>
<td>3</td>
</tr>
<tr>
<td>Science</td>
<td>12</td>
</tr>
<tr>
<td>Mathematics</td>
<td>3</td>
</tr>
</tbody>
</table>

51 or 57 hours
Major Requirements (Art) 40 or 41 hours

Lower Division (21 hours):
9 hours of art history, ARH 100, 101, and 102. 12 hours of studio (6 courses), with at least one course at 100 level in each of these areas: design, drawing, or sculpture. Photography (ARS 165) is recommended. This is not counted as drawing or design. Prerequisites for upper division courses should be kept in mind when selected these courses.

Upper Division (19 or 20 hours):
3 hours of art history at the 300 level, 2 hours of painting (ARS 370 or 371), 12 hours (6 courses) in studio, including at least 2 areas in addition to painting (at least 4 hours of these will be at the 300 level) and an art elective (studio 2 hours or art history 3 hours). Printmaking (ARS 382 or 383) is recommended.

Education Department Requirements 21 hours

ED 261 (3 hours), ED 263 (3 hours), ED 388 (3 hours), ED 490 (3 hours), ED 497 (9 hours).

Cluster 6 to 21 hours

Must include 18 hours in one of the 26 state-approved minor subjects. (Lists of these are available in Education or Art offices.) This certifies the graduate to teach up to 50% time load in that subject in Alabama grades 7 through 12.

Elective

Requirements are fulfilled with completion of education courses.

Total requirements for this program: 118 to 140 hours

Program 2:

Class B Certificate to Teach Only Art in all Grades (K-12).

General Education Requirements: As in Program 1. 51 or 57 hours

Major-Cluster Composite Program (AOC) 51 hours

Requirements: Studio, 32 hours (including 12 hours upper division courses). Art history, 15 hours (including 6 hours upper division courses), and ARS 215 (3 hours).
Education Department Requirements 21 hours

ED 261 (3 hours), ED 263 (3 hours), ED 388 (3 hours), ED 490 (3 hours), ED 492 and 498 (total 9 hours).

Total requirements for this program: 123 to 129 hours

Program 3:

Class B Certificate for Elementary Classroom Teaching with Art Specialty.

General Education Requirements: Elementary General Education Requirements (including ARS 215). 66 or 72 hours
See pages in catalog.

Major (Art) Same as in Program 1. 40 or 41 hours

Cluster Education Program (See Supporting Cluster in Professional Education page 94 ) 27 hours

Total requirements for this program: 133 to 140 hours

It is vital for the student to officially establish his program of Art-Education studies as early as possible.

Plan II Art Program for the Exceptional Student

Plan II involves a supplement to the major requirements stated under Plan I, Program 1 or Program 2.

This program is designed 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 prior to graduation.

Plan II requires 6 additional hours above the requirements for graduation. Plan II may be followed in two ways:

A. Independent study (6 hours — Art 490, 491) in the candidate’s specialty, leading to a one-man exhibition (for the studio specialist) or the presentation of a research paper at a seminar meeting in the last term of the senior year (for the art history specialist); or

B. 6 additional semester hours of work in art history may be scheduled by the studio major, or 6 additional semester hours work in studio may be scheduled by the art history major.
Supportive Art Cluster

A student primarily interested in another discipline who wishes to include courses in art history and/or in studio areas of art 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. Art courses may be combined with pertinent courses in related disciplines to form a supportive cluster with the advice and consent of the Department Chairman.

The Morley Denbo Annual Metal Sculpture Awards Program

The Denbo Iron and Metal Company Annual Metal Sculpture Awards Program was established with the hope that it would help make the enjoyment of art part of man's daily life. Specifically, the Awards Program will encourage student sculptors at UAH by funding a special program which will annually present three purchase awards for metal sculpture. The winning pieces will be exhibited by the Denbo Iron and Metal Company of Decatur, Alabama, thereby providing a showcase for UAH sculptors and publicizing the Denbo Company's commitment to improving the human environment.

A maximum of ten advanced level UAH art students will be accepted into the program each year. A selection committee will pick the participants based on their presentation of a proposal for a welded or cast metal sculpture. The proposal must demonstrate that the student has given his project previous consideration. He may submit a model or a detailed outline for a piece which would utilize a new material or technique. Each student will also be required to submit a portfolio of his previous art work. A student's acceptance to the program would constitute his agreement to complete his sculpture by the deadline.

The selection committee will meet twice each year — the third week of the fall quarter and the second week of the winter quarter. The ten student participants must submit their completed sculpture the last week of the spring quarter when a jury will award the three purchase prizes: $300, $200 and $100. These sculptures will become the property of the Denbo UAH Sculpture Collection and will be exhibited as part of the Denbo Iron and Metal Company's commitment to bringing art to man's daily environment. The jury will also select from the remaining seven pieces any number they wish to accompany the three winners on exhibition for one calendar year. At the end of the year these additional pieces will be returned to the students. As the sculpture will be sent on exhibition, each student will provide a custom built wooden shipping crate.

Denbo Iron and Metal Company will provide each student accepted into the program with the necessary materials and/or assistance for the completion of his sculpture. As the student must be chosen by a jury, his acceptance to the program will become part of his artistic history.
Eligibility

To be eligible, UAH art students must be of junior or senior standing and have completed Art 140, 141, 342 and at least one other junior level sculpture course.

One credit hour will be awarded upon completion of the program.

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

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

Art and architecture of the Western World from the 1st century A.D. to the late 18th century examined in the light of social change and of the emergence of the artist as an individual.

102 Art History Survey: Neo-Classic to Contemporary Art 3 hrs.
Art and architecture from the late 18th century to the present examined against the background of the Industrial Revolution and the evolving age of science and technology.

109 Introduction to Criticism and Appreciation of Art; Aesthetics in the Visual Arts 3 hrs.
Not applicable for art majors.

120 Two-Dimensional Form in Design 2 hrs.
An introduction to the primary fundamentals of two-dimensional design, encompassing analytical and intuitive work in dot, line, and plane on the pictorial surface.

121 Color in Design 2 hrs.
An investigation into the physiological, psychological, and physical properties of color, with experimental studio work in both the subjective and objective evaluation of color usage.

140 Sculptural Use of Organic Materials 2 hrs.
Introduction in clay to three-dimensional form and space and practice in mold-making and casting techniques and the use of hydrocal materials as a constructive material.

141 Sculpture: Metal Assemblage 2 hrs.
Welded metal as sculpture-oxyacetylene and arc welding.

160 Drawing with Dark-On-Light Media 2 hrs.
Introduction to two-dimensional form and expression through the use of the traditional means of line, value, texture, composition, etc.

161 Drawing with Fluid Media 2 hrs.
Introduction to the use of inks, washes, oils, gouache, airbrush, and related media.

162 Drawing with Light-On-Dark Media 2 hrs.
Introduction to the use of light drawing materials, (charcoal, pastels, oil paints) rather than dark materials. Especially useful in preparation for oil painting.

163 Drawing with Collage 2 hrs.
Introduction to drawing systems that involve assembling preformed visual materials.
Photography for Drawing and Design 2 hrs.
The understanding and practice of photography through its use as a drawing and design medium photograms through 35mm. Students are not required to own photographic equipment. Required for all studio art majors.

Drawing and Rendering for Illustration 2 hrs.
Drawing techniques for illustration. Investigation in expressive and objective drawing styles in the professional media. Free-hand sketching, perspective studies, rendering techniques, and composition in line, form, value and color. Recommended for communication graphics specialists and for those taking interior design and decoration courses.

Art for Elementary Teachers 3 hrs.
Introduction to art methods and media for elementary school teachers. This course is presented by lecture, demonstration, discussion, reading and studio experience.

Upper Division

United States Art 3 hrs.
Art and architecture from the Colonial Period to the present, taking into account influences from abroad, and the rise of the U. S. to a position of leadership in Modern Art. Prerequisite: ARH 101 and 102.

Classical Art 3 hrs.
The art and architecture of Ancient Greece and their influence on the development of the visual arts of the Roman empire. Prerequisite: ARH 100.

Medieval Art 3 hrs.
The influence of Christianity on the art of the Western World as expressed in Early Christian, Romanesque and Gothic architecture, sculpture and painting. Prerequisite: ARH 100 and 101.

Italian Renaissance Art 3 hrs.
The visual arts of Italy from 1250 to 1550 taking into consideration the rise of the artist as a creative individual and his expanding role in society. Prerequisite: ARH 100 and 101.

Contemporary Art 3 hrs.
The painting, sculpture, and architecture of Europe and America from 1900 to the present with emphasis on the changing role of the artist and the influence of new materials and techniques on his creativity. Prerequisite: ARH 102.

Northern Renaissance Art 3 hrs.
Art and architecture of Northern Europe from 1300 to 1600 taking into consideration influences from Italy which contributed to the development of the Renaissance in the North. Prerequisite: ARH 100 and 101.

Southern and Northern Baroque Art 3 hrs.
The development of Baroque and Rococo Art in Italy, Spain and Northern Europe. Prerequisite: ARH 101.

Japanese Art 3 hrs.
The art and architecture of Japan and influences from Korea, India and China. The effect of the developing dichotomy of ancient traditions and modern technology of Japanese art. Consideration of contemporary developments tempered by the prevailing heritage artistry and design consciousness of the Japanese. Prerequisite: ARH 100.

Period Styles in Interior Design 3 hrs.
A survey of the historical development of European and American period styles,
including a discussion of contemporary trends. Architectural styles are considered as background for related styles of furnishing. Design principles that provide a basis for selection furnishings are presented.

310 19th and Early 20th Century Art 3 hrs.
Developments in art and architecture between 1780 and 1940 which provide the foundation for the Modern Art movement. Prerequisite: ARH 101 and 102.

330 Fundamentals of Advertising Design 2 hrs.
Introduction to the tools, techniques and practices of the professional graphic designer. Study of the history of lettering design, with studio practice in functional lettering techniques. Theory and practice in film animation techniques as applied to graphic design problems. Prerequisite: ARS 120 or 121, or approval of instructor.

331 Advertising Layout and Typographic Design 2 hrs.
Principles of effective visual layout design utilizing photographic and art imagery. Study of contemporary type design and usage with studio practice in the layout media of the professional designer. Methods of preparation of art for reproduction in color and black and white. Contemporary letterpress use. Prerequisite: ARS 120 or 121, or approval of instructor.

332 Illustration 2 hrs.
Studio practice in contemporary illustrational concepts and techniques. Investigation into the development of the art of illustration and its present direction, with drawing and painting experience in the latest pattern and reproduction films, as well as experimental expressive media. Prerequisite: ARS 120 or 121, 197, or approval of instructor.

340 Sculptural Use of the Thermoset Plastics 2 hrs.
Sculptural manipulation of thermoset resins and foams. Prerequisite: ARS 140, or approval of instructor.

341 Sculptural Use of the Thermoplastics 2 hrs.
Manipulation of thermoplastics by bonding, dyeing, forming, and welding. Prerequisite: ARS 140, 141, or approval of instructor.

342 Sculpture: Investment Casting 2 hrs.
Introduction to the lost-wax method of producing cast metal sculpture. The creation of sculpture in wax, the investment of these waxes in refractory molds and casting in bronze and aluminum will constitute the major emphasis of this course. Prerequisite: ARS 140, 141 or approval of instructor.

343 Sculpture Workshop 2 hrs.
Extension and additional exploration of techniques of sculpture related to student’s previous experience in the various sculptural media. Provides an opportunity for additional work in the 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.

344 Sculpture: Carving 2 hrs.
Manipulation of three dimensional forms via the subtractive technique. Work in both stone and wood. Prerequisite: ARS 140 or 141 or approval of instructor.

345 Sculpture: Sand Casting of Metal 2 hrs.
Introduction to bonded-sand casting and industrial foundry practices. Prerequisite: ARS 140 or 141, or approval of instructor.
Oil Painting 2 hrs.
An advanced course dealing with the fluid nature and brilliance of oil paints, essentially representational. Prerequisite: one of ARS 120, 121; and one of ARS 160, 161, 162, 163 or approval of instructor.

Tempera Painting 2 hrs.
Advanced studio experience in painting with graphic, quick-drying materials, essentially non-objective. Prerequisite: one of ARS 120 or 121; and one of ARS 160, 161, 162, 163, or approval of instructor.

Mixed Media (Replicative) 2 hrs.
Introduction to the studio practice with 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.

Painting 2 hrs.
Painting in various media. Suitable approaches in relation to the various characteristics of the media used will be encouraged. Some previous introductory work in drawing or painting desirable or approval of instructor. Credit not applicable to the requirements for the major in the painting specialty.

Mixed Media (Unique Object) 2 hrs.
Painting with combinations of media normally used separately or outside the painting process; 3-D construction, machines, sound, light projection or transmission, etc. Prerequisite: one of ARS 120, 121; and one of ARS 160, 161, 162, 163 or approval of instructor.

Graphics: Intaglio Printmaking 2 hrs.
Beginning studio practice in etching and engraving. Prerequisite: ARS 121; and one of ARS 160, 161, 162, 163, or approval of instructor.

Graphics: Planographic Printmaking 2 hrs.
Beginning studio practice in lithography. Prerequisite: one of ARS 160, 161, 162, 163 or approval of instructor.

Graphics: Relief Printmaking 2 hrs.
Beginning studio practice in the relief print media, utilizing woodcut, wood engraving, linoleum cut and related relief techniques. Experimental media in color and black and white. Hand and mechanical press usage. Prerequisite: ARS 120 or 121; and one of ARS 160, 161, 162, 163, 197 or approval of instructor.

Graphics: Silkscreen Printmaking 2 hrs.
Introduction to silkscreen color printing for both fine art and commercial use. Various stencil techniques, including the latest professional handcut film and photographic methods. Prerequisite: ARS 120 or 121; and one of ARS 160, 161, 162, 197 or approval of instructor.

Senior level courses involve the independent initiative of the degree candidate. He should have completed all foundation courses and all general education requirements before commencing the senior program.

Art History Seminar: Renaissance and Baroque Art 3 hrs.
Discussion and guided research on artists, works of art, and subjects closely related to art. The aim of the course is to teach the methods of developing a scholarly research paper. Prerequisite: ARH 100, 101 and the upper division course covering the area of art under investigation ARH 303, 305 or 306.

Art History Seminar: Modern Art 3 hrs.
Discussion and guided research on artists, works of art, and subjects closely related to
art. The aim of the course is to teach the methods of developing a scholarly research paper. Prerequisite: ARH 102 and 304 or 310.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>402</td>
<td>Art History Seminar: American Art</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>430</td>
<td>Advanced Studio Problems in Communication Graphics</td>
<td>2 hrs.</td>
</tr>
<tr>
<td>470</td>
<td>Advanced Studio Problems in Painting</td>
<td>2 hrs.</td>
</tr>
<tr>
<td>500</td>
<td>Special Problems in Art History</td>
<td>1-3 hrs.</td>
</tr>
</tbody>
</table>

Discussion and guided research on artists, works of art, and subjects closely related to art. The aim of the course is to teach the methods of developing a scholarly research paper. Prerequisite: ARH 100, 101, 102 and 300.

Individual content by consultation. Prerequisite: senior standing.

Individual content by consultation. Prerequisite: senior standing.

Individual content by consultation. Prerequisite: senior standing.

Individual content by consultation. Prerequisite: senior standing.

Individual content by consultation. Prerequisite: senior standing.

Independent study in art history leading to a presentation of a research paper at a seminar meeting or independent work in studio specialty leading to a one-man exhibition in the last term of the senior year. This course must be followed by ARS 491.

Independent study in art history leading to a presentation of a research paper at a seminar meeting or independent work in studio specialty leading to a one-man exhibition in the last term of the senior year. Prerequisite: ARS 490.

Technical problems in specific studio areas for which advanced course sequences in a studio field are not available. Based on introductory work in the studio area involved. Can be repeated for a total of six hours credit. Prerequisite: advanced standing and course work or equivalent experience in the particular studio area concerned and prior permission of the instructor and the Department Chairman.

Directed reading and research. Prerequisite: advanced standing, twelve hours of art history, previous course work in the area to be studied, and approval of instructor.
Business Administration

Professors: Bucher (chairman), Graves, Traylor; Assistant Professor: Watts; Instructor: Sered

Business Administration Programs

The Business Administration faculty offers courses to satisfy the requirements for a Bachelor of Science in Business Administration degree with a major in management, accounting, finance, or marketing.

A student who is majoring in another discipline and is interested in a business administration cluster may choose a minimum of 21 semester hours. It is recommended that the following courses be included in the 21 hour cluster: AC 211, AC 212, FIN 351, MGT 301, MKT 301. Six additional hours may be chosen from other business offerings.

Requirements for the BSBA Degree

Minimum requirements for the Bachelor of Science in Business Administration degree are 128 semester hours. To meet the requirements for a BSBA degree, the student must satisfy 47-53 semester hours of General Education Requirements, complete an approved Area of Concentration (AOC) with a maximum of 64 semester hours, and take a minimum of 12 hours of electives chosen from disciplines not in the AOC. Courses which are included both in General Education Requirements and also the AOC are omitted in calculating the maximum of 64 hours in the AOC. A student must select a cluster from a non-business area.

General Education Requirements

<table>
<thead>
<tr>
<th>Semester Hours</th>
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</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>HUMANITIES AND BEHAVIORAL SCIENCES</td>
</tr>
<tr>
<td>English Composition</td>
</tr>
<tr>
<td>Survey of English Literature</td>
</tr>
<tr>
<td>Origin and Development of the Contemporary World</td>
</tr>
<tr>
<td>Economics, Philosophy, Political Science, Psychology</td>
</tr>
<tr>
<td>or Sociology--one discipline</td>
</tr>
<tr>
<td>NATURAL SCIENCE</td>
</tr>
<tr>
<td>Biology, Chemistry, Physics, Natural Science or</td>
</tr>
<tr>
<td>Environmental Science--one discipline</td>
</tr>
<tr>
<td>MATHEMATICS</td>
</tr>
<tr>
<td>MA 105, 133, 153 (or demonstrated competency through 153)</td>
</tr>
</tbody>
</table>
LANGUAGES
A student may choose one of the following options:
(a) 12 hours in a foreign language
(b) 12 hours in one of the following areas:
  (i) Mathematics beyond MA 153
  (ii) Statistics other than EC 231
  (iii) Computer other than CS 113, or
(c) 12 hours combination from i, ii, or iii of (b)

Area of Concentration — Major Options

The following courses are required in all major options:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 113</td>
<td>Introduction of Computing</td>
<td>3</td>
</tr>
<tr>
<td>EC 142</td>
<td>Principles of Economics I</td>
<td>3</td>
</tr>
<tr>
<td>EC 143</td>
<td>Principles of Economics II</td>
<td>3</td>
</tr>
<tr>
<td>AC 211</td>
<td>Principles of Accounting I -- Financial</td>
<td>3</td>
</tr>
<tr>
<td>AC 212</td>
<td>Principles of Accounting II -- Managerial</td>
<td>3</td>
</tr>
<tr>
<td>FIN 351</td>
<td>Corporate Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGT 220</td>
<td>Industrial Management</td>
<td>3</td>
</tr>
<tr>
<td>MGT 301</td>
<td>Essentials of Management</td>
<td>3</td>
</tr>
<tr>
<td>MKT 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>BUS 231</td>
<td>Statistics</td>
<td>3</td>
</tr>
<tr>
<td>BUS 321</td>
<td>Business Law</td>
<td>3</td>
</tr>
<tr>
<td>BUS 420</td>
<td>Business Policy</td>
<td></td>
</tr>
</tbody>
</table>

Total: 36 Semester Hours

Additional Requirements for each major option are as follows:

ACCOUNTING (AC)
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC 313</td>
<td>Income Tax Procedures</td>
<td>3</td>
</tr>
<tr>
<td>AC 314</td>
<td>Cost Accounting</td>
<td>3</td>
</tr>
<tr>
<td>AC 310</td>
<td>Intermediate Accounting</td>
<td>3</td>
</tr>
<tr>
<td>AC 311</td>
<td>Financial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>AC 415</td>
<td>Advanced Accounting</td>
<td>3</td>
</tr>
<tr>
<td>AC 431</td>
<td>Auditing I</td>
<td>3</td>
</tr>
<tr>
<td>AC 432</td>
<td>Auditing II</td>
<td>3</td>
</tr>
</tbody>
</table>

Total: 21 Semester Hours

FINANCE (FIN)
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN 352</td>
<td>Money and Banking</td>
<td>3</td>
</tr>
<tr>
<td>FIN 361</td>
<td>Investments</td>
<td>3</td>
</tr>
<tr>
<td>FIN 375</td>
<td>Financial Institutions</td>
<td>3</td>
</tr>
<tr>
<td>FIN 362</td>
<td>Security Analysis and Portfolio Management</td>
<td>3</td>
</tr>
<tr>
<td>FIN 531</td>
<td>Managerial Finance</td>
<td>3</td>
</tr>
<tr>
<td>FIN 260</td>
<td>Personal Finance</td>
<td></td>
</tr>
</tbody>
</table>

Total: 18 Semester Hours
MANAGEMENT (MGT)
MGT 361 Organizational Behavior 3
MGT 363 Personnel Management 3
MGT 410 Social Responsibilities of Business 3
MGT 570 Seminar in Management 3
Six Hours:
MGT 400 Management Science I 6
MGT 401 Management Science II
or
MGT 362 Management and Labor Economics
MGT 450 Wage and Salary Administration 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
MKT 410 Marketing Management 3
MKT 420 Marketing and Social Responsibility 3 18

Supportive Business Administration Cluster

A student who is majoring in another discipline and is interested in a business administration cluster may choose a minimum of 21 semester hours. It is recommended that the following courses be included in the 21 hour cluster: AC 211, AC 212, FIN 351, MGT 301, MKT 301. Six additional hours may be chosen from other business offerings.

Business (BUS)

231 Applied Statistics for Social and Behavioral Sciences 3 hrs.
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 "t" distribution. Prerequisite: MA 105, or college algebra or its equivalent, or the approval of the instructor. Same as PSC 231, PY 231, SOC 231, and EC 231.

311 Computer Applications in Economics and Business I 3 hrs.
Business systems and data processing; 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. Includes ANSI COBOL. Prerequisite: CS 308. Same as EC 311 and CS 311.

321 Business Law 3 hrs.
Introductory course emphasizing the legal environment in business.

322 Public Policy Toward Business 3 hrs.
Same as EC 322.
Intermediate Economic and Business Statistics 3 hrs.
Index numbers and index number construction, analysis of time series (trends, cyclical, seasonal, and random factors affecting time series), linear regression and correlation, the "F" distribution, introduction to multiple regression and analysis of variance. Prerequisite: BUS 231. Same as EC 325.

Computer Applications in Economics and Business II 3 hrs.
Techniques in economic business modeling; case studies of business applications; computer simulation of business operations. Projects requiring independent research. Prerequisite: BUS 311. Same as EC 411 and CS 411.

Business Policy 3 hrs.
An examination of the integrative effect of policy decisions on marketing, production, finance, and personnel. The role and responsibilities of the business enterprise in the economic, political, legal, social, and technological environment in which it operates. The student will be required to apply and demonstrate the application of several disciplines to the recognition and solution of business problems. Prerequisite: Senior standing.

Accounting (AC)

Principles of Accounting I--Financial 3 hrs.
A basic conceptual approach to the art of accounting emphasizing recording, measuring, and communicating the accounting data of business entities. Data creation and accumulation on the basis of the double-entry theory is developed. The development, structure, content and analysis of the principal accounting financial statements are also covered.

Principles of Accounting II--Managerial 3 hrs.
Managerial (internal) accounting is introduced with the emphasis on the flow of responsibility in a corporation, cost control-standard costs and cost behavioral-performance measurement for service, product-handling, and manufacturing entities, planning alternate courses of operations, and planning the acquisition of facilities. Prerequisite: AC 211.

Intermediate Accounting 3 hrs.
Detailed theoretical and sequential treatment of topics introduced in beginning accounting courses to include: survey of contemporary basic accounting principles; analysis of working capital items and non-current items; concepts of measuring profit and loss in the firm. Prerequisite: AC 212.

Financial Accounting 3 hrs.
Theoretical analysis of present-day accounting practice with particular regard to cost approach; income tax implications in measuring financial position; study of accounting principles board (APB) opinions, financial accounting standards board (FASB) opinions; examination of analytical processes of statement preparation including funds-flow and cash-flow reporting in financial statements adjusted for price-level changes. Prerequisite: AC 211.

Income Tax Procedure 3 hrs.
Determination of taxable income and selected aspects of tax accounting for individuals. Prerequisite: AC 211.

Cost Accounting 3 hrs.
The theory and technique of cost determination and analysis with emphasis on the major purpose of management accounting-aiding in decisions for planning and control. Topics discussed will include the measurement and accumulation of costs-product costing, cost-volume-profit relationships, flexible budgets, master budgets, overhead application, responsibility accounting, make or buy decisions, incremental analysis, and the influences of quantitative techniques on management accounting. Prerequisite: AC 212.
415 Advanced Accounting 3 hrs.
Partnership accounting, consignments, installment sales, foreign exchange, reorganizations and mergers and acquisition-business, combinations, home-branch accounting. Prerequisites: AC 310, 311.

417 Governmental Accounting 3 hrs.
Special features of budgetary and fund accounting as applied to municipalities, other governmental units and institutions such as schools and hospitals. Prerequisite: AC 314.

420 Internship in Accounting 3 hrs.
Under the direction of a faculty adviser. Students attain employment experience with public accounting firms or industrial firms. Prerequisite: written consent of instructor.

430 Accounting Systems 3 hrs.
An examination of the accounting system as an element of the management information system in various types of businesses. Prerequisite: AC 311.

431 Auditing I 3 hrs.
Auditing theory and practice, working papers, financial statements, and professional ethics. Prerequisite: AC 415.

432 Auditing II 3 hrs.
Auditing research, audit of electronic data processing systems, statistical sampling. Prerequisite: AC 431.

450 Studies in International Accounting 3 hrs.
A study of the differences in the principles of accounting and auditing standards, and auditing procedures in selected countries of the world. Prerequisite: written consent of instructor.

460 Controllership 3 hrs.
Managerial Profit Planning and Budgetary Control; types of budgets and cost-volume-profit analysis. Prerequisite: AC 314.

470 Honors Seminar in Accounting 3 hrs.

Finance (FIN)

260 Personal Finance 3 hrs.
A review of the problems and techniques of family financial planning. Benefits and cautions of consumer credit, insurance, home ownership and personal investing relative to current economic and legal constraints.

351 Corporate Finance 3 hrs.
Promotional, financial, structural and social features of the basic types of business organizations. Prerequisite: EC 143.

352 Money and Banking 3 hrs.
Organization, operation and economic significance of the monetary and banking systems. Prerequisite: EC 143. Same as EC 352.

353 Public Finance 3 hrs.
Principles of taxation, government expenditures, borrowing, and fiscal administration. Prerequisite: EC 143. Same as EC 353 and PSC 353.
361 Investments
Study and appraisal of investment media, standards for investment programs, sources of supply of investment funds, demand for investment sources, speculative transactions, pricing, and techniques of investment forecasting. Prerequisite: FIN 351.

362 Security Analysis and Portfolio Management
Approaches to investment strategy and decision. Valuation of securities and import of dividend policy and capital structure. An examination and study of the principles underlying security selections, timing and diversification to achieve optimum balance for various investment goals. Prerequisite: FIN 351 and FIN 361.

375 Financial Institutions
A study of the role and activities of financial intermediaries in the capital formation process. An examination of the capital markets in which these institutions operate. Prerequisite: FIN 351.

452 State and Local Finance
A study of administration, fiscal importance and economic effects of state and local finances. The recent trends in state and local revenue and expenditure and their significance will be emphasized. Prerequisite: EC 142. Same as EC 452.

Graduate and Undergraduate Credit

531 Managerial Finance
Examination of principles and tools of analysis available to management. Topics include financial decision-making as a coordinating process, administrative responsibility, short and long-term financial instruments, government regulation, promotion, refunding, capital investment decision, capital costs, and the process of security issues. Prerequisites: MGT 300 and FIN 351.

554 International Finance
Study of foreign exchange rates under different monetary standards, methods of financing international trade, international financial institutions, proposals for fostering international trade through specialized forms of reserves and problems of international liquidity. Prerequisite: FIN (EC) 352.

590 Monetary and Credit Policy
Analysis of monetary and federal reserve policies, their influence on money, price, interest rate and employment with special emphasis on the maintenance of economic stability and progress. Prerequisite: FIN (EC) 352; EC 340 is optional.

Management (MGT)

220 Industrial Management
A comprehensive introduction to the industrial organization, its structure, environment, functions and systems as well as to industrial engineering, its role and methods. Same as EC 220.

301 Essentials of Management
The elements of the managerial process that are fundamental to the successful operation of various types of enterprises.

361 Organizational Behavior
A behavioral science and social systems approach to the behavior of people at work in organizations. Behavioral decision-making, organization theory, the communication process, work motivation, groups, leadership, organizational climate, organizational development and other aspects of human behavior in organizations. Prerequisite: MGT 300.
362 Management and Labor Economics 3 hrs.
Psychological and institutional factors as well as economic analysis of the major aspects of such problems as employment, wages, hours unionism, labor-management relations, and social security. Prerequisite: EC 143.

363 Personnel Administration 3 hrs.
Study of traditional and current theories and business personnel practices, issues and problems. Evaluation of the latest findings of organizational and administrative personnel research relating to the needs of today's large, complex business enterprise. Prerequisite: MGT 361.

400 Management Science I 3 hrs.
Applications of management science in business organizations. Topics include systems analysis, management information systems, and the use of quantitative models. Bayesian decision theory is developed and applied to the solution of practical business problems. Game theory and utility (preference) theory and their contributions are also explored. Prerequisites: MA 143, BUS 231, MGT 300.

401 Management Science II 3 hrs.
The use of quantitative analysis to improve the managerial decision process. Mathematical programming techniques, such probabilistic models as queueing, inventory, and markov, and simulation methods are covered. Prerequisites: EC 310, BUS 325, MGT 400 (or equivalents).

410 Social Responsibilities of Business 3 hrs.
Identification of discussion of power influence in the American business system. An examination of issues over which businessmen and other interest groups have been divided, and the role and responsibilities of business institutions in their cultural and social environment.

427 Management Systems Analysis 3 hrs.
A system approach to the study of formal organizations. Presents analytical techniques for making decisions about organizational design. Prerequisites: EC 220 and EC 390. Same as EC 427.

450 Wage and Salary Administration 3 hrs.
Examination of complexities of the modern corporation's total compensation system, study of administration of systematic wage and salary policies, review of central concepts relating to personnel recognition and reward. Prerequisite: MGT 363.

490 Special Projects 3 hrs.
Active involvement in an on-going project in a business enterprise which has particular interest and relevance to the student; or, an in-depth investigation of a contemporary business problem. Prerequisites: Senior standing and approval of the department chairman.

Graduate and Undergraduate Credit

520 International Management 3 hrs.
A study of some of the major difficulties confronting managers of organizations doing business within or across the borders of foreign countries.

570 Seminar in Management 3 hrs.
Treatment of selected topics in management. Prerequisites: Senior or graduate standing and approval of instructor.
Marketing (MKT)

301 Principles of Marketing 3 hrs.
An introductory course to the field of marketing. The functional, commodity and institutional approaches are integrated and studied from the viewpoint of the consumer and the marketing manager.

332 Consumer Behavior 3 hrs.
An interdisciplinary approach to the analysis and interpretation of consumer buying habits and motives, and the resultant purchases of goods and services. The purchaser's psychological, economic, and sociocultural actions and reactions are stressed as they relate to a better understanding of consumption. Prerequisite: MKT 301.

342 Promotional Strategy 3 hrs.
The overall purpose of the course is to examine the promotional techniques available to marketing management. In the course the student becomes acquainted with consumer behavior and with the communication process providing the means by which products can be effectively promoted. The specific tools of personal selling, advertising, sales promotion, and publicity are examined as components of overall promotional strategy. Prerequisite: MKT 301.

343 Market Research 3 hrs.
To provide the student with an understanding of how the research function fits into the marketing operations of the business. To expose the student to the various techniques and information sources available to the marketing researcher. And finally to expose the student to the concept of marketing information systems and to the role of marketing research in such systems. Prerequisites: MKT 301, BUS 231.

345 Market Channel Structure and Strategy 3 hrs.
A study of marketing channels as a functional area and the alternative choices available to marketing management in developing over-all marketing strategy. Attention will be given to institutional structures and the dynamic interrelationships in distribution logistics. Prerequisite: MKT 301.

410 Marketing Management 3 hrs.
Management of the marketing function of the firm: determination of objectives, organization and controls for the effect utilization of marketing resources in a coordinated effort with other major functional areas. The identification and selection of Market opportunities, formulation of competitive strategies and development of Marketing policies and programs. Prerequisites: Senior standing and 15 hours in Marketing.

414 Industrial Marketing 3 hrs.
An examination of the complex and highly competitive market for industrial goods. Develop an understanding of the size and professional nature of this market, its problems and solutions. Prerequisite: MKT 301.

415 Sales Management and Professional Salesmanship 3 hrs.
This course combines and integrates the techniques and concepts of professional selling with the problems of sales management. This course is structured to establish and evaluate objectives and policies for sales managers concerning managing the sales force and methods of market analysis in terms of sales forecasts and sales budgeting. There will be some in-depth study of the problems faced by sales management in the area of competition, pricing, and promotion. Prerequisite: MKT 301.

416 Retailing Policy and Management 3 hrs.
The policies, practices and problem solutions in the efficient operation of both chain and independent retail stores. Includes the study of such problem areas as store location, organizational layout, merchandise planning and control, buying, pricing and promotion. Prerequisite: MKT 301.
Marketing and Social Responsibilities
3 hrs.
Examines some of the responsibilities of businesses as a member of and an influence upon the society in which it operates. A look at some of the problems which have developed historically as well as some of the difficulties present in today’s business environment, and evaluate these in the light of how they could have been avoided with proper recognition of responsibilities. Prerequisite: Senior standing.

Graduate and Undergraduate Credit

International Marketing
3 hrs.
An examination of the procedures and problems associated with establishing and carrying out marketing operations in foreign countries or with foreign companies. The institutions, principles and methods involved in solving these business problems will be analyzed as well as the effects of national differences in business practices and regulation. Prerequisite: 15 hours in marketing.

Communication

An interdisciplinary approach to the field of Communications is under development. The program seeks to provide the student with a knowledge of the nature of human communication, the symbol systems by which it functions, the environment in which it occurs, its media and its effects. Courses are either presently offered or are being developed in the areas of journalism, radio-TV broadcasting, theatre, organizational communication and speech communication.

The Communication Committee is expanding the course offerings and preparing a proposal for cluster in Communications. Please consult with the Academic Advisement and Information Center for additional Communication offerings. The following courses are presently offered as electives in the School of Humanities and Behavioral Sciences. CM 110, 113 or 114 will satisfy requirements for teacher certification.

Communication (CM)

Voice and Diction
3 hrs.
Study of language and speech production with attention to the development of individual vocal skills.

Basic Speech Communication
3 hrs.
Study and practice of the forms and methods of rhetorical communication.

Oral Interpretation
3 hrs.
Study and practice of the artistic and communicative skills needed to read literature to others.

Persuasion
3 hrs.
Study and practice in the techniques of problem-solving. Emphasis on the modes of discussion, persuasion, and argumentation.

Acting
3 hrs.
Emphasis on role-playing and fundamentals.

Play Production
3 hrs.
Study and practice in the methods of producing a play.
A survey of mass communication theory, the history of American mass media, and
criticism of the contemporary forms and functions of the mass media of communication
in the United States.

201 Journalism I 3 hrs.
Study of the fundamentals of news value and elements of a newsstory. Emphasis on
composition.

202 Journalism II 3 hrs.
Emphasis on reporting skills in the specialized areas of local government, police and the
courts, and education. Prerequisite: CM 201 or approval of instructor.

Developmental Learning

Associate Professors: Coffield, Tarter, Wharry (chairman); Assistant Professors:
Butts, Fleming, Hays, Kilgo, Kirkpatrick

Graduate work in developmental learning was implemented in September, 1972.
This interdisciplinary program 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 opportunities to study the total
developmental process and see how that process is affected by the physiological and
emotional factors impinging on the human organism. It can provide training for
persons who wish to become remedial specialists, diagnostic and resource teachers
associated with the public schools, or specialists who work with pediatricians,
psychologists, ophthalmologists or optometrists and who wish to direct clinical
programs.

The program, which leads to the master's degree, requires 6 credit hours in a core
curriculum and 15 credit hours in a professional specialization. The candidate for
this degree must also submit a thesis or take an additional 6 credit hours.
Professional specializations are offered in learning disabilities, learning theory,
diagnostic procedures, and child development.

To be admitted to the graduate program in developmental learning, a student must
meet the general requirements for admission to Graduate School as indicated on page 84
of this catalog.

Developmental Learning (DL)

593 Education of Exceptional Children and Youth 3 hrs.
Introduction to the field of exceptional children and youth.

601 Early Childhood Development 3 hrs.
Provides an in-depth study of physical, psychological, and social growth and develop-
ment and maturation in early childhood. Will give particular attention to the perceptual,
cognitive, and psychomotor processes that more directly affect learning and behavior. A
look at normal development will precede and provide a basis for an analysis of the
atypical. Includes observation practicum.
602 Psychopathology of Children With Learning Problems 3 hrs.
A comprehensive study of symptoms and learning theory as related to children with learning problems. Includes observation and participation practicum.

603 Sensory-Motor Readiness in Children 3 hrs.
Provides an understanding of the necessary early learning process in children from birth to six years of age. The student is presented with techniques and sequential approaches to sensory-motor training on a developmental basis. Includes participation practicum.

604 Adaptive Academics 3 hrs.
Provides students with a sequential and veridical approach to making sensory-motor adaptations in academic areas so that programs can be developed to serve individuals who can best learn through adaptive and concrete procedures of a sensory-motor nature. Includes participation practicum.

605 Curriculum For Early Childhood Education 3 hrs.
The study of structuring environments for optimum developmental learning. Curriculum models will be surveyed. Includes observation practicum.

606 Language Development 3 hrs.
The study of stages of language development and techniques for stimulating language development and communication skills in the young child. Includes practicum.

610 Interdisciplinary Aspects of Intervention 3 hrs.
A seminar surveying the psychological and sociological aspects of learning. A multi-disciplinary approach to learning and problems that require intervention will involve professionals in the community who are immediately concerned with these problems in a particular discipline. Includes observation practicum.

625 Diagnostic Procedures: Advanced Psychometrics 3 hrs.
Deals with psychometric theory and psychological tests. In first phase of the course, psychometric issues such as standardization, validity, reliability and theory of testing will be covered. In second phase, the mathematical techniques used in psychometrics such as factor analysis and trend analysis will be examined. The third phase will survey standardized tests in the areas of intelligence, psychomotor assessment, personality, etc. Includes observation practicum.

626 Diagnostic Procedures: Selected Tests For Preschoolers 3 hrs.
A practicum in administration, interpretation and use of selected tests for preschool-age children. A minimal level of competency will be defined which all students will be required to master.

627 Diagnostic Procedures: Selected Tests For School-Age Children 3 hrs.
An advanced practicum in administration, interpretation and use of selected tests for elementary school children. A minimal level of competency will be defined which all students will be required to master.

628 Human Learning Theory 3 hrs.
Will critically examine various approaches to the field of human learning. Description of behavioral changes commonly called "learning," as well as closely related behavioral phenomena such as transfer, retention, and stimulus generalization will be emphasized. Inter-relationships between these behavioral changes and areas such as motivation, perception, personality and neurophysiology will also be considered. Examples of the applications of learning principles to the learning problems of children and adults will be studied.

629 Behavior Modification 3 hrs.
Presents the basic psychological principles concerning the control of human behavior and reviews current theoretical experimental research in the field of behavior modification.
630 Statistics And Methodology
Research Methodology will include an overview of experimentation, simple data presentation, normal probability vs. non-normal distributions, correlation, and reliability and validity. Will examine both the concept and actual work type situations. Prerequisite: PY 231.

631 Diagnostic Procedures: Stanford-Binet
A practicum in administration, interpretation, and use of the Stanford-Binet intelligence test. A minimal level of competency will be defined which all students will be required to master. Prerequisites: PY 231 or DL 630, DL 625, DL 626 or DL 627, and permission of Professor.

632 Diagnostic Procedures: Wechsler
A practicum in administration, interpretation, and use of the Wechsler intelligence tests. A minimal level of competency will be defined which all students will be required to master. Prerequisites: PY 231 or DL 630, DL 625, DL 626 or DL 627, and permission of Professor.

640 The Family In A Changing Society
The study of the family as the primary unit of society; its major influence on the growth and development of the individual; problems and difficulties experienced in the family in a society in transition; the relationships of the family and other educational institutions of society.

644 Advanced Studies In Socialization
In-depth survey and critical analysis of comparative theories of socialization. Particular emphasis is placed on how theoretical constructs may be transformed into effective child training practices.

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

650 Practicum
Provides both group and clinical experiences in working with children’s learning patterns and deviations on an individual basis.

699 Master’s Thesis
Required each term a student is working and receiving direction on his master’s thesis. A minimum of two terms required to M.S. students. A maximum of 9 hours of credit is awarded upon successful completion of the master’s thesis.

Economics

Associate Professors: Bond, Mirakhor (chairman); Assistant Professor: Wu; Instructor: Scriven

Area of Concentration (AOC) with Economics Major

The Department of 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) which include the following: EC 231, 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 Departments of Economics and/or Business in his area of interest.
An example of an AOC for a degree in economics for students interested in graduate work in economics may be:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC 231</td>
<td>Applied Statistics for Social and Behavioral Sciences</td>
<td>3</td>
</tr>
<tr>
<td>EC 241</td>
<td>Marketing Economics</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 325</td>
<td>Intermediate Statistics</td>
<td>3</td>
</tr>
<tr>
<td>EC 340</td>
<td>Macro Economic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EC 341</td>
<td>History of American Economic Growth</td>
<td>3</td>
</tr>
<tr>
<td>EC 345</td>
<td>Micro Economic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EC 352</td>
<td>Money and Banking</td>
<td>3</td>
</tr>
<tr>
<td>EC 430</td>
<td>Introduction to Econometrics</td>
<td>3</td>
</tr>
<tr>
<td>EC 460</td>
<td>Problems in Economics</td>
<td>3</td>
</tr>
<tr>
<td>EC 448</td>
<td>Development of Economic Theory</td>
<td>3</td>
</tr>
<tr>
<td>EC 546</td>
<td>International Economics and Trade</td>
<td>3</td>
</tr>
<tr>
<td>EC 585</td>
<td>Comparative Economic Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC 111</td>
<td>Principles of Accounting</td>
<td>3</td>
</tr>
<tr>
<td>MGT 200</td>
<td>Principles of Management</td>
<td>3</td>
</tr>
<tr>
<td>EC 231</td>
<td>Applied Statistics for Social and Behavioral Sciences</td>
<td>3</td>
</tr>
<tr>
<td>EC 241</td>
<td>Marketing Economics</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 325</td>
<td>Intermediate Statistics</td>
<td>3</td>
</tr>
<tr>
<td>EC 340</td>
<td>Macro Economic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EC 341</td>
<td>History of American Economic Growth</td>
<td>3</td>
</tr>
<tr>
<td>EC 345</td>
<td>Micro Economic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EC 352</td>
<td>Money and Banking</td>
<td>3</td>
</tr>
<tr>
<td>EC 448</td>
<td>Development of Economic Theory</td>
<td>3</td>
</tr>
<tr>
<td>MGT 561</td>
<td>Managerial Economics</td>
<td>3</td>
</tr>
<tr>
<td>BUS 420</td>
<td>Business Policy</td>
<td>3</td>
</tr>
</tbody>
</table>

39

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA 153</td>
<td>Calculus and Analytic Geometry</td>
<td>3</td>
</tr>
<tr>
<td>MA 154</td>
<td>Calculus and Analytic Geometry</td>
<td>3</td>
</tr>
<tr>
<td>MA 233</td>
<td>Calculus and Analytic Geometry</td>
<td>3</td>
</tr>
<tr>
<td>MA 244</td>
<td>Introduction to Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>MA 251</td>
<td>Calculus and Analytic Geometry</td>
<td>3</td>
</tr>
<tr>
<td>MA 352</td>
<td>Introduction to Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>MA 385</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
</tbody>
</table>

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Supportive Economics Cluster

A student whose area of interest is in a discipline other than economics, but wishing a supportive cluster in economics, may, in consultation with and approval of the economics faculty, choose (a) 21 semester hours of appropriate courses offered in the Economics Department, or (b) appropriate courses offered in economics as part of a cluster with other disciplines to support his major area of interest.

The following are examples of possible clusters with a major in various other disciplines:

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>With Mathematics</td>
</tr>
<tr>
<td>EC 142 Principles of Economics</td>
</tr>
<tr>
<td>EC 143 Principles of Economics</td>
</tr>
<tr>
<td>EC 231 Applied Statistics for Social and Behavioral Sciences</td>
</tr>
<tr>
<td>EC 352 Money and Banking</td>
</tr>
<tr>
<td>And any three of the following four courses:</td>
</tr>
<tr>
<td>EC 340 Macro Economic Analysis</td>
</tr>
<tr>
<td>EC 341 History of American Economic Growth</td>
</tr>
<tr>
<td>EC 345 Micro Economic Analysis</td>
</tr>
<tr>
<td>EC 448 Development of Economic Theory</td>
</tr>
<tr>
<td>24</td>
</tr>
<tr>
<td>With History</td>
</tr>
<tr>
<td>EC 142 Principles of Economics</td>
</tr>
<tr>
<td>EC 143 Principles of Economics</td>
</tr>
<tr>
<td>EC 322 Public Policy Toward Business</td>
</tr>
<tr>
<td>EC 341 History of American Economic Growth</td>
</tr>
<tr>
<td>EC 344 European Economic History</td>
</tr>
<tr>
<td>EC 510 Survey of Economic Theory</td>
</tr>
<tr>
<td>EC 585 Comparative Economic Systems</td>
</tr>
<tr>
<td>21</td>
</tr>
<tr>
<td>With Psychology</td>
</tr>
<tr>
<td>EC 142 Principles of Economics</td>
</tr>
<tr>
<td>EC 143 Principles of Economics</td>
</tr>
<tr>
<td>EC 241 Marketing Economics</td>
</tr>
<tr>
<td>EC 322 Public Policy Toward Business</td>
</tr>
<tr>
<td>EC 325 Intermediate Statistics</td>
</tr>
<tr>
<td>EC 341 History of American Economic Growth</td>
</tr>
<tr>
<td>EC 510 Survey of Economic Theory</td>
</tr>
<tr>
<td>EC 585 Comparative Economic Systems</td>
</tr>
<tr>
<td>24</td>
</tr>
</tbody>
</table>
Economics (EC)

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

142 Principles of Economics I 3 hrs.
Introduction to economic analysis and its use in dealing with business or governmental problems. Material in the first term concentrates on national income, price levels, employment, and simple demand and supply theory. Prerequisite: MA 104 or 105 recommended.

143 Principles of Economics II 3 hrs.
A continuation of EC 142. Concentrates on more advanced value theories, including problems of monopoly or partial monopoly, distribution of income along functional lines, international economics, and economic growth. Prerequisite: EC 142.

231 Applied Statistics for Social and Behavioral Sciences 3 hrs.
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 "t" distribution. Prerequisite: MA 105, or college algebra or its equivalent, or the approval of the instructor. Same as BUS 231, PSC 231, PY 231 and SOC 231.

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 of marketing activities, principles, structures, functions, policies, prices, costs, and quantitative problems from the social, consumer, and management points of view. Prerequisite: EC 143.

300 Marxian Economics 3 hrs.
Critical survey of the economic theory of capitalism as developed in the writings of Marx, Engels, and Lenin, with emphasis upon Marx's theory of labor value, the theory of crises, and the theory of imperialism. The Marxist theory is analyzed in terms of its place in the history of the economic thought, and is 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 3 hrs.
An introductory treatment of differential and integral calculus, difference and differential equations, determinants and matrices with application to economic problems. Prerequisite: EC 143, MA 105.

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. Includes ANSI COBOL. Prerequisite: CS 308. Same as BUS 311 and CS 311.

315 Urban Economics 3 hrs.
Oriented toward an understanding of a variety of urban phenomenon and problems. A brief look at central place theory, location theory and externalities; followed by a survey of location patterns and changes within metropolitan areas and an analysis of selected urban problems. Throughout, the roles of both private and public sectors will be examined in the process of urban development. Prerequisite: EC 310.
321 Engineering Economy 3 hrs.
Deals with economic evaluation of engineering alternatives. Topics include interest, depreciation, time-value of investments, learning curves, and replacement analysis. Prerequisite: EC 142, MA 233 or EC 310. Same as EG 321.

322 Public Policy Toward Business 3 hrs.
Analysis of regulation which government may impose upon business and a survey of basic constitutional principles and legal aspects of the more recent federal legislation affecting business. Same as BUS 322.

325 Intermediate Economic and Business Statistics 3 hrs.
Index numbers and index number construction, analysis of time series (trends, cyclical, seasonal, and random factors affecting time series), linear regression and correlation, the "F" distribution, introduction to multiple regression and analysis of variance. Prerequisite: EC 231.

340 Macroeconomic Analysis 3 hrs.
Comprehensive study of the national economy as a whole including analysis of the national income accounts, consumption, saving, investment, money, interest, employment, price level, monetary and fiscal policy, and economic growth. Prerequisite: EC 143, 310 or its equivalent.

341 History of American Economic Growth 3 hrs.
A survey of the origins of basic economic institutions in Europe followed by a detailed study of the historical development of these institutions in the United States. Prerequisite: EC 143.

344 European Economic History 3 hrs.
Industrial Revolution to current developments covering institutions, activities, economic systems, and policies. Prerequisite: EC 143.

345 Microeconomic Analysis 3 hrs.
More intensive examination of the economic principles underlying value and distribution with additional training in the 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 the 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 and PSC 353.

411 Computer Applications in Economics and Business II 3 hrs.
Techniques in economic business modeling; case studies of business applications; computer simulation of business operations. Projects requiring independent research. Prerequisite: EC 311. Same as BUS 411 and CS 411.

430 Introduction to Econometrics 3 hrs.
Use of statistical and mathematical tools in economics, structural relationships of economic models, and introduction to economic model building. Prerequisite: EC 310, 325, 340 and 345, or approval of instructor.

448 Development of Economic Theory 3 hrs.
Study of the 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.
A study of administration, fiscal importance and economic effects of state and local
finances. The recent trends in state and local revenue and expenditure and their significance will be emphasized. Prerequisite: EC 142. Same as FIN 452.

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

Courses for graduate and undergraduate credit — offered upon sufficient demand.

510 Survey of Economic Theory  3 hrs.
This course is primarily designed for students who have had no prior training in economics and who wish to take further courses in economics. The course will be rigorous treatment of basic principles underlying economic theory. The topics to be considered will be introduction to: theory of national income determination, theory of market structures, principles of value and distribution theory. Prerequisite: approval of the instructor.

546 International Economics and Trade  3 hrs.
Theoretical principles underlying international trade with an application of these principles to recent historical developments and to current national policies. Prerequisite: EC 345 or approval of instructor. EC 510 and the approval of the instructor for non-economics majors.

564 Regional Economics  3 hrs.
Introduction to location theory and regional economics, analysis of factors affecting location of economics activity, and consideration of differential growth rate among regions, and introduction to methods of regional analysis. Prerequisite: EC 235, 340, and 345 or equivalent. EC 510 and the approval of the instructor for non-economics majors.

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

Courses for graduate credit — offered upon sufficient demand

600 Theory of Income and Employment  3 hrs.
This is a continuation of EC 340. In this course more advanced treatment of theory of national income determination and associated concepts are considered. Prerequisite: EC 340 or equivalent. EC 510 and the approval of the instructor for non-economics majors.

610 Theory of Value and Distribution  3 hrs.
This course is a continuation of EC 345. Consideration of classical and neoclassical theory of value and distribution. Prerequisite: EC 345 or equivalent. EC 510 and the approval of the instructor for non-economics 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 the estimation of single-equation models (autocorrelation, multicollinearity, heteroscedasticity). Prerequisite: EC 430. EC 510 and the approval of the instructor for non-economics majors.

630 Evolution of Economic Thought  3 hrs.
Methodology and social philosophy of outstanding economists, and their part in shaping economic development. The treatment will be selective and will emphasize the 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 630 or consent of the instructor. EC 510 and the approval of the instructor for non-economics majors.

700 Research in Economics  3 hrs.
Special topics in the area of student interest. Prerequisite: EC 630.
Education (ED)

Professor: Engle; Associate Professors: Brindley (chairman), Gibson, Kilgo, Wharry; Assistant Professors: Butts, Moebes

Students in The School of Humanities and Behavioral Sciences or The School of Science and Engineering who wish to qualify for the Alabama Class B Elementary, Secondary, or Elementary-Secondary Professional Teachers Certificate must meet the following requirements.

Admission to the Teacher Education Program

During the winter or spring term of the sophomore year, students should make application for admission to the teacher education program with the Department of Education. Applicants to the program should:

1. Have a cumulative quality-point average of 1.00 on all work attempted.
2. Have completed at least 70% of the General Education Requirements.
3. Have presented acceptable confidential evaluations prepared on forms provided for this purpose.

Application for Student Teaching

Before April 15 of the student's 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. A grade point average of 1.20 in all work attempted and a grade point average of 1.10 in all work attempted in the major field.
2. A grade point average of 1.20 in all work attempted in education courses.
3. Satisfactory completion of all appropriate General Education Requirements.

Application for Teacher Certification

Near the end of the teacher education program, the student must complete the State Department of Education certification application at the Office of Student Records.

In order to be recommended for the teaching certificate, a student in addition to fulfilling the general degree requirements, must earn as many quality points as hours attempted in education courses.

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 and middle schools.
The scope of the PEEC makes it imperative that the student indicate during the freshman year, to the education office, his goal in elementary education. The student will be assigned an adviser in the education discipline who will aid him in planning an efficient course of study. This planning requires the student also to seek counseling with a professor who represents the department of the student’s major for the AOC.

A student’s major 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>Semester Hours</th>
<th>HUMANITIES &amp; BEHAVIORAL SCIENCES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Freshman Composition (EH 101-102)</td>
</tr>
<tr>
<td></td>
<td>Survey of English Literature (EH 205-206)</td>
</tr>
<tr>
<td></td>
<td>Speech (SP 110, 113 or 114)</td>
</tr>
<tr>
<td></td>
<td>Origins and Development of the Contemporary World (HY 101-102 or 391-392)</td>
</tr>
<tr>
<td></td>
<td>Art for the Elementary Teacher (ART 215)</td>
</tr>
<tr>
<td></td>
<td>Music for the Elementary Teacher (MU 215)</td>
</tr>
<tr>
<td></td>
<td>Physical Education for the Elementary Teacher (ED 215)</td>
</tr>
<tr>
<td></td>
<td>Modern Foreign Language (One language)</td>
</tr>
<tr>
<td></td>
<td>Economics, Political Science or Sociology (6 hours from one discipline)</td>
</tr>
<tr>
<td></td>
<td>Economics, History, Political Science or Sociology (a minimum of 3 hours in a discipline other than history and the one chosen above)</td>
</tr>
<tr>
<td></td>
<td>Psychology (PY 103)</td>
</tr>
</tbody>
</table>

### SCIENCE—MATHEMATICS

For a B.A. degree a student should select one of the following options:

1. 8 hours in biology or a physical science
   - 4 hours in the second area
   - 3 hours in mathematics
   - Total: 12

2. 12 hours natural science (NS 111, 112, 113)
   - 3 hours in mathematics
   - Total: 15

For a B.S. degree — 8 hours in biology and 8 hours in chemistry or physics
- 9 hours in mathematics
- Total: 16
Area of Concentration (AOC)

MAJOR AREA OF STUDY

A student must complete a major as specified by the academic department offering the major in the School of Humanities & Behavioral Sciences or the School of Science & Engineering.

SUPPORTING CLUSTER IN PROFESSIONAL EDUCATION

<table>
<thead>
<tr>
<th>Semester Hours</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Professional Course:</td>
<td></td>
</tr>
<tr>
<td>Human Development (ED 230)</td>
<td>3</td>
</tr>
<tr>
<td>Foundations of Education in the U.S. (ED 261)</td>
<td>3</td>
</tr>
<tr>
<td>Educational Psychology (ED 263)</td>
<td>3</td>
</tr>
<tr>
<td>Group Processes (ED 265-266)</td>
<td>2</td>
</tr>
<tr>
<td>Professional Courses:</td>
<td></td>
</tr>
<tr>
<td>(Students must be admitted to the Teacher Education Program to enroll in the following courses.)</td>
<td></td>
</tr>
<tr>
<td>Diagnostic and Prescriptive Teaching (ED 360)</td>
<td>3</td>
</tr>
<tr>
<td>Group Processes (ED 367)</td>
<td>1</td>
</tr>
<tr>
<td>Select one of the following courses:</td>
<td></td>
</tr>
<tr>
<td>Language Arts for the Early Elementary Grades, 1-3, (ED 370)</td>
<td>2</td>
</tr>
<tr>
<td>Language Arts for the Later Elementary Grades, 4-6, (ED 371)</td>
<td>2</td>
</tr>
<tr>
<td>Select two of the following courses outside of the major:</td>
<td></td>
</tr>
<tr>
<td>Teaching the Social Studies (ED 372)</td>
<td>2</td>
</tr>
<tr>
<td>Teaching the Natural Sciences (ED 373)</td>
<td>2</td>
</tr>
<tr>
<td>Teaching of Arithmetic (ED 374)</td>
<td>2</td>
</tr>
<tr>
<td>Student Teaching in the Elementary School (ED 491)</td>
<td>6</td>
</tr>
</tbody>
</table>

Electives

The number of elective hours possible is dependent upon the major area of study and the student’s high school curriculum.

PROFESSIONAL SECONDARY EDUCATION CURRICULUM

The curriculum in secondary education is planned to provide a broad liberal education base and an in-depth study of a single discipline to prepare the teacher for the emergent master teacher and team teaching roles in the junior and senior high schools.
General Education Requirements

Semester Hours

HUMANITIES & BEHAVIORAL SCIENCES

English Composition (EH 101-102 or 103-104) 6
Survey of English Literature (EH 205-206) 6
Speech (EH 110, 113 or 114) 3
Origins and Development of the
Contemporary World (HY 101-102 or 391-392) 6
Modern Foreign Language (One language) 6-12
Economics, Political Science, or Sociology (6 hours
from one discipline). 6
Psychology (PY-103) 3

SCIENCE—MATHEMATICS

For a B.A. degree, student should select one of the following options:

1. 8 hours in biology or a physical science 12
   4 hours in the second area
   3 hours in mathematics 3

2. 12 hours natural science (NS 111, 112,
   113) 12
   3 hours in mathematics 3

For a B.S. degree — 8 hours in biology and 8 hours
in chemistry or physics 16
9 hours in mathematics 9

Area of Concentration (AOC)

MAJOR AREA OF STUDY

The student planning to teach in secondary school may select a major area of study from any academic department offering a major and which is approved for certification by the State Department of Education. Approved majors in the School
of Humanities and Behavioral Sciences are Art, Economics, English, History, French, German, Political Science, Psychology, and Sociology. Approved majors in the School of Science and Engineering are Biology, Chemistry, Mathematics, Mathematics Education, and Physics. Specific requirements for each major are cited under the appropriate department.

SUPPORTING CLUSTER

A group of courses in one or more academic departments relating to the major area of study may make a supportive cluster. In areas that do not relate to a composite major, a minimum of 18 hours must be drawn from one department to make a certifiable cluster.
Professional Education Courses

Semester Hours

ED 261 Foundations of Education in the United States 3
ED 263 Educational Psychology 3
ED 388 Teaching Secondary School Subjects 3
ED 490 Principles of High School Teaching 3
ED 497 Secondary Student Teaching 9

Electives

The number of elective hours possible is dependent upon the major area of study and the student’s high school curriculum.

Education (ED)

111 Career Exploration
   Educational and Vocational Planning. Prerequisite: 9 hours college credit and placement tests. 1 hr.

261 Foundations of Education in the United States
   The development of education in America and its relation to prospective teachers. Prerequisite: sophomore standing. 3 hrs.

263 Educational Psychology
   Psychological principles basic to an understanding of the learner, the learning process, and the learning situation. Prerequisite: PY 103 and sophomore standing. 3 hrs.

325 The Sociology of Education
   A 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. 3 hrs.

411 Guidance for Teachers
   The sociological, psychological, and philosophical bases for guidance in schools. 3 hrs.

456 Mental Health in the School
   Dynamics of behavior, the recognition of minor maladjustments, the criteria for referral, and classroom practices supporting good mental health. Prerequisite: ED 263 or equivalent and junior standing. 3 hrs.

467 Tests and Measurements
   Survey of standardized and teacher-made evaluation instruments. 3 hrs.

500 Special Problems in Education
   Independent study. Prerequisite: senior standing. 1-3 hrs.

549 Audio-Visual Instruction
   Audio-visual media in teaching, the selection, use, and maintenance of audio-visual materials in educational programs. 3 hrs.

Elementary Education

215 Physical Education for the Elementary Teacher
   Designed to give a basic understanding of body alignment, developmental exercises and movement exploration activities for physical education in the elementary grades. 3 hrs.
Additionally, there will be study of student needs to provide proper equipment, facilities, and leadership for the overall program.

230 Human Development 3 hrs.
Overview of human development from conception to adulthood, stressing continuity. Practical applications for teachers and parents.

231 Teaching the Young Child 3 hrs.
Considers the total pattern of child development, curriculum, learning, methods, and guidance for the child from two to nine years of age.

265 Group Processes I 1 hr.
Informal group counseling experiences to help the student attain a better understanding of himself and of others. A knowledge of group processes and their effective use in education is emphasized.

266 Group Processes II 1 hr.
Informal group counseling experiences to help the student attain a better understanding of himself and of others. A knowledge of group processes and their effective use in education is emphasized. Prerequisite: ED 265.

360 Diagnostic and Prescriptive Teaching 3 hrs.
Emphasis on analyzing and determining the strengths and deficiencies of a student in an academic area and subsequently devising a program which will enhance his strengths and remediate his weaknesses. Both group and individual processes are explored. Prerequisite: ED 263, junior standing, and admission to teacher education program.

367 Group Processes III 1 hr.
Informal group counseling experiences to help the student attain a better understanding of himself and of others. A knowledge of group processes and their effective use in education is emphasized. Prerequisite: ED 266.

Note:
ED 370 thru 374 include a minimum of 16 hours laboratory experience in local elementary schools.

370 Language Arts for Early Elementary Grades (1-3) 2 hrs.
Current practices in reading instruction, the instructional materials, and the characteristics of the learner, with special attention to development of basic language skills appropriate to the level. Prerequisite: ED 360.

371 Language Arts for Later Elementary Grades (4-6) 2 hrs.
Current practices in language arts instruction, materials, and the characteristics of the students, with special attention to the development of all language arts skills appropriate to the level. Prerequisite: ED 360.

372 Teaching the Social Studies 2 hrs.
Curriculum, instructional approaches, and materials for teaching social studies in grades 1-6. Emphasis placed on helping beginning teachers acquire background and skills in organizing and teaching units of work. Prerequisite: ED 360.

373 Teaching the Natural Sciences 2 hrs.
A course stressing the examination, design, and evaluation of experiences for teaching the natural sciences in the elementary school. Prerequisite: ED 360.

374 Teaching of Arithmetic 2 hrs.
The examination, design, and evaluation of experiences for teaching mathematics in elementary school. Modern trends in mathematics education. Prerequisite: ED 360.
491 Student Teaching in the Elementary School 6 hrs.
Teaching experience in local elementary schools under supervision. Concurrent conferences to be arranged as needed.

492 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. Prerequisite: senior standing.

Secondary Education

388 Teaching Secondary School Subjects 3 hrs.
(Major area of teaching to be designated.) Materials and methods in the various major fields. Prerequisite: ED 263 and admission to the teacher education program.

490 Principles of High School Teaching 3 hrs.
Prerequisite: ED 388 and senior standing. This course is taken concurrently with student teaching.

497 Secondary Student Teaching 9 hrs.
(Major area of teaching to be designated.) Observation and student teaching in secondary schools. Prerequisite: ED 388 and senior standing.

498 Observation and Participation in Teaching 3-6 hrs.
Selected observation and participation in secondary schools. For students in curricula designed for both secondary and elementary and for experienced teachers. Prerequisite: senior standing and ED 388.

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 495 recommended.

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.)

Librarianship

101 Introduction to Libraries and Bibliography 2 hrs.
Systems of library retrieval and their use; construction of bibliographies and footnotes; library resources of the area.

380 Library Operation and Management 2 hrs.
Methods of organizing books and other library materials; includes ordering, processing, circulating, mending, binding, inventory, budgeting, business records, housing, and equipment.

571 Function and Use of the School Library 3 hrs.
School libraries in education programs; includes historical development of libraries, standards, library service to teachers and pupils, use of library.

573 Selection of Materials 3 hrs.
Principles, policies, practices and problems in the selection of books and other materials and of techniques in the promotion of their use.
Books for Young People
Reading and evaluating books and related materials according to the interests, needs, and abilities of high school age youth.

Graduate Study in Education

A Master of Arts degree in developmental learning is described on page 84. Options available under this degree include learning disabilities. This option leads toward Alabama Class A Certification.

A student admitted to the graduate program of the College of Education at the University of Alabama, Tuscaloosa, may apply a maximum of 9 semester hours earned at UAH toward the master's degree.

Graduate Education Courses

600 Public School Organization and Administration 3 hrs.
A systematic treatment of the problems of local, state and national administration. Views the newer developments which are modifying educational administration, state authorization and organization, the board of education, the superintendent of schools, personnel and management, financial support, and public relations.

603 Sources of American Educational Thought 3 hrs.
The foundations of education as seen in their philosophical, historical, social, and/or comparative aspects. Describes major relationships of schools and educative processes with society at large, pointing to the 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. Focuses on the factors that determine learning, the conditions of effective teaching, the administrator and supervisor as the organizer of the milieu wherein teaching, learning and growth occur.

606 Principles of Curriculum Development 3 hrs.
Principles of curriculum construction which 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.

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 the elementary school.

630 Modern Secondary School Programs 3 hrs.
Survey of important viewpoints and issues, reorganization trends, typical research findings by subject fields and analysis of current curriculum proposals at the national, state, and local levels.
**English**

Professors: Francis, Hutchens, Martin, Welker (chairman), Woodard; Associate Professor: Munson; Assistant Professors: Conover, Dillard, Harrison, Kiser; Instructor: Allen

**Area of Concentration (AOC) with English Major**

Requirements for a major: 24 to 40 semester hours, excluding General Education Requirements (EH 101-102 or 103-104 and EH 205-206). The hours are identified as follows, with the provision that one group (but not more than one) must be fulfilled with a course devoted exclusively to the novel (courses marked with an asterisk) and that at least 6 semester hours be taken in courses numbered 400 or above. Transfer students majoring in English must take at least 12 semester hours of advanced 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 cluster without special approval of the English faculty.

<table>
<thead>
<tr>
<th>Semester Hours</th>
<th>Basic courses (EH 101-102 or 103-104 and EH 205-206)</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shakespeare (EH 360)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>American Literature (EH 330, 331, 430*, 431*, 532, 533*)</td>
<td>3</td>
</tr>
<tr>
<td>I</td>
<td>Middle Ages and Renaissance (EH 450-550, 460, 471-571)</td>
<td>3</td>
</tr>
<tr>
<td>II</td>
<td>Restoration and 18th Century (EH 380, 381, 470-570, 492*, 501*)</td>
<td>3</td>
</tr>
<tr>
<td>III</td>
<td>19th Century (EH 390, 391, 493*)</td>
<td>3</td>
</tr>
<tr>
<td>IV</td>
<td>Modern Literature (EH 420, 421, 500, 594*)</td>
<td>3</td>
</tr>
<tr>
<td>Electives in English</td>
<td></td>
<td>6-16-36-46</td>
</tr>
</tbody>
</table>

The English major as defined above will form a part of an area of concentration which must include one of the following variations:

1. A cluster drawn from one discipline now offering a major which includes a minimum of 21 semester hours, 6 hours of which must be numbered 300 or above.
2. A cluster drawn from two or more disciplines which includes a minimum of 21 semester hours, of which 9 hours must be in courses numbered 300 or above.

A student majoring in English may plan a variety of AOC's which will enable him to develop depth and breadth in English and some related areas chosen from the other humanities, the behavioral sciences, mathematics, engineering, and the natural sciences. Help in planning, if needed, is available through English counselors and the AOC Committee of the English faculty.
Supportive English Clusters

A supportive cluster in English should include a minimum of 21 semester hours of which at least 3 must be taken in courses numbered 400 or above, identified as follows:

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Courses (EH 101-102 or 103-104 and EH 205-206)</td>
</tr>
<tr>
<td>Shakespeare (EH 360)</td>
</tr>
<tr>
<td>One course chosen from Groups I, II, or III as listed in requirements for English major</td>
</tr>
<tr>
<td>Electives in English</td>
</tr>
<tr>
<td>A student with a one-discipline cluster in English must take at least 6 semester hours of advanced English courses (numbered 300 or above) at UAH.</td>
</tr>
</tbody>
</table>

Graduate Program

The English graduate faculty offers courses in English and American literature to satisfy the requirements for the M.A. degree in English. In addition to the Graduate School requirements, the requirements for the Master of Arts in English are:

1. 18 semester hours of graduate work in English, 6 hours of which may be transferred credit approved by the departmental Graduate Committee.

2. 6 additional semester hours of elective graduate courses in English or a related subject approved by the Graduate Committee.

3. At least 50% 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).


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 per term will be permitted.

6. Reading knowledge of French, German, or Spanish.

7. Oral comprehensive examination on courses taken and on thesis. For students who do not write a thesis, both oral and written examinations are required.

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 Education courses designated by the Education Department may be substituted for the thesis.

2. A minimum of 33 hours is required: 24 hours in English, 9 in Education.

3. The student must hold Class B certification.

4. Both oral and written comprehensive examinations are required for those who do not write a thesis.
Applicants for graduate study in English must present a satisfactory undergraduate scholastic record and satisfactory Graduate Record Examination (GRE) scores in both the aptitude and English portion of the examination. Each applicant must:

a. Have a minimum overall undergraduate quality point average of at least 2.0 (A=3.0), or at least 2.0 for the last 60 hours of work, and
b. Score at least 1,000 on the aptitude portion of the GRE, and
c. Have an undergraduate major in English or its equivalent as determined by the departmental Graduate Committee.

An applicant whose scholastic record does not fully meet the requirement for admission may be admitted provisionally. See section on School of Graduate Studies and Research in this catalog.

**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 of 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 theme 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, including at least one documented paper 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>Similar to, but more intensive than EH 101. Required of and open only to students whose placement test score indicates superior ability. Prerequisite: placement.</td>
<td></td>
</tr>
<tr>
<td>104</td>
<td>Advanced Freshman Composition</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Similar to, but more intensive than EH 102. Prerequisite: EH 103.</td>
<td></td>
</tr>
</tbody>
</table>

Courses below are open to students who have completed EH 102 or 104.

<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 literature through Milton. Prerequisite: EH 101 and 102 or 103 and 104.</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 20th century. Prerequisite: EH 205.</td>
<td></td>
</tr>
</tbody>
</table>

Courses below are open to students who have completed EH 206, with exceptions as indicated.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>207</td>
<td>Modern English Grammar</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Review of traditional and structural grammar; introduction to transformational syntax.</td>
<td></td>
</tr>
<tr>
<td>208</td>
<td>History of the English Language</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Survey of the morphological, syntactic, and lexical development of the English language, with emphasis on the structure of present-day English. Prerequisite: EH 205.</td>
<td></td>
</tr>
<tr>
<td>210</td>
<td>Fiction Writing</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Practice in writing of fiction, from conception to revision. Approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>240</td>
<td>World Literature</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Selected major contributions to Western civilization; Homer to Dante.</td>
<td></td>
</tr>
</tbody>
</table>
241 World Literature
Selected major contributions to Western civilization; Rabelais to the present. 3 hrs.

242 Classical Mythology
Study of classical mythology in terms of its historical background as well as the metaphorical and archetypal significance of duties and myths. Prerequisite: EH 102 or 104. 3 hrs.

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.

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

380 Restoration and Early 18th Century
Dryden, Swift, Pope, and others. 3 hrs.

381 Later 18th Century
Johnson, Boswell, and others. 3 hrs.

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

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

420 Modern Poetry
Major movements in American and British poetry of the 20th century. 3 hrs.

421 Modern Drama
A study of the major ideas and forces which originated new movements in drama from Ibsen to the present. 3 hrs.

430 The American Novel
Theme and form of the American novel from Cooper to James. 3 hrs.

431 The American Novel
Representative works from the school of naturalism to the present. 3 hrs.

432 The Southern Renaissance
Origin and development of Southern myth with particular emphasis on major writers of the Southern Renaissance. 3 hrs.

450 Chaucer
Emphasis on Canterbury Tales and Troilus and Criseyde in middle English. 3 hrs.

460 Renaissance Non-Dramatic Poetry
Renaissance poetry, Wyatt through Donne. 3 hrs.

470 Milton and the 17th Century
Milton, cavalier and metaphysical poetry, and selected prose. 3 hrs.

471 English Drama
From its beginnings to 1642, exclusive of Shakespeare. 3 hrs.
492 The English Novel
Critical reading of representative novels, accompanied by historical survey of major trends. Fielding to Thackeray.

493 The English Novel
Critical reading of representative novels, accompanied by historical survey of major trends. George Eliot to present.

Courses listed below are open to students who have acquired senior standing, permission of the Instructor, or graduate status.

500 Literary Criticism
Major theories and methods, with application by student. Additional seminar paper for graduate credit.

501 Theory of the Novel
A seminar on the current debate against the background of earlier theory and practice. Seminar paper and report for graduate credit.

507 English Linguistics I
An advanced survey of the linguistic analysis of contemporary English. Major topics include transformational analysis of English Grammar, an introduction to English dialect studies, socio- and psycho-linguistic aspects of spoken and written English, and linguistic analysis of prose style.

508 History of the English Language
A 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 which have taken place in the language. Consideration will also be given to the historical events which have influenced and effected changes in the language.

511 Introduction to Library Research
1 hr.

520 Modern Poetry
Major movements in British and American Poetry of the Twentieth Century. Selected readings in the more important criticism.

530 Special Studies in American Literature
Intensive study of one or more writers, groups, or movements, announced in advance.

532 Southern Renaissance
The phenomenon of the Southern Literary Renaissance studied in its historical and cultural setting as a means of exploring the Southern myth, its origins, its values, its contribution to and its development by the major Southern writers of the 1920's through the 1960's. Prime focus will be on the Fugitive-Agrarians (Robert Penn Warren, Allen Tate, Donald Davidson, John Crowe Ransom, Andrew Lytle, etc.), the New Critics, and such major authors as William Faulkner, Eudora Welty, Carson McCullers, Thomas Wolfe, Flannery O'Connor, and Katherine Anne Porter.

533 William Faulkner
Critical study of the works of Faulkner, concentrating on his major phase, 1929-42; biography and backgrounds. Lecture, reports, term paper.

540 Special Studies in English Literature
Intensive study of one or more writers, groups, or movements, announced in advance.

550 Chaucer
*The Canterbury Tales* and the major works studied in relation to their English and European literary and philosophical tradition. In Middle English. Extensive report required of graduate students.

104
Elizabethan Drama
A concentration on one of the major genres; romance and tragicomedies (Peele, Greene, Dekker, Beaumont and Fletcher), urban satire (Jonson, Marston, Chapman, and Middleton), or tragedy (Marlowe, Marston, Chapman, Webster, Tourneur, Middleton, and Ford). Classical and Medieval antecedents will be considered briefly, and some attention will be given to changes in the intellectual, social, and political milieu as background for the evolution of the genre under consideration.

Contemporary Novel
A concentration on major novelists writing in English, with representative emphasis on their world contemporaries, as they attempt to depict reality in response to the demands of the post-Darwinian world.

The Idea of the Tragic
A close study of elements which figure in tragic theory common to tragedy as a theater form and to the tragic as it is reflected in the modern novel, ranging from the theories of Attic tragedy through Roman, Christian, Shakespearean, French Eighteenth-Century, and in the novel.

Studies in American Literature to 1865
Consideration of major movements from Colonial times to 1865; selected major figures or special problems will be considered in depth (topics may vary). Lectures, reports, term paper.

American Literature from 1865 to the Present
Consideration of change and development in terms of genre, theme, and major figures. Emphasis may vary. Lectures, reports, term paper.

Selected Studies in Medieval Literature
Offered upon demand.

Selected Studies in Anglo-Saxon Literature
Offered upon demand.

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

Milton
A study of Paradise Lost, Paradise Regained, and Samson Agonistes in the light of Milton's exposition of his thought in De Doctrina Christiana, of Education, other prose works and the early poems. These ideas will be considered both in seventeenth-century terms and in the terms of modern thought.

Eighteenth-Century Studies
A seminar using the two Walpoles, Robert and Horace, as points of departure for studying the literary life of the century. Interdisciplinary participation by members of the history, philosophy, and fine arts faculties.

Studies in English Romanticism
Seminar. An examination of selected poetry and critical prose, with particular attention to aesthetic theory and the philosophical and psychological backgrounds. Reports and papers.

Studies in the Victorian Period
Seminar. A study of representative writing, both poetry and prose, with particular emphasis on social and cultural changes which inform the literature. Reports and papers.
Studies in the English Novel

An examination of its origins, the nature of the synthesis that produced it, and its subsequent directions. Readings illustrative of its increasing conscious artistry.

Master's Thesis

Required each term a student is working and receiving direction on his master's thesis. A minimum of two terms is required, and no more than 6 hours' credit is allowed for the thesis.

Health, Physical Education and Recreation

Instructor: Willis

Health, Physical Education and Recreation courses are offered only as electives. Activities courses carry one semester hour of credit with no more than six hours counting toward graduation. Grades of Satisfactory or Unsatisfactory are given, based primarily on a student's improvement in skill rather than on the level of ability which he brings to the course. No more than four hours credit toward graduation will be allowed for intercollegiate athletics activity courses. A participant in a varsity sport may not enroll in a regular activity course in that sport. The regular letter-grade system applies in the academic courses.

Health, Physical Education and Recreation (HPE)

100 Physical Fitness for Men 1 hr.
101 Body Conditioning for Women 1 hr.
102 Beginning Tennis 1 hr.
103 Beginning Golf 1 hr.
104 Basketball 1 hr.
105 Volleyball 1 hr.
106 Softball 1 hr.
107 Folk and Square Dance 1 hr.
108 Soccer & Speedball 1 hr.
109 Bowling 1 hr.
110 Ice Skating 1 hr.
140 Varsity Sports - Basketball 1 hr.
141 Varsity Sports - Soccer 1 hr.
150 Contemporary Medicine and the Young Adult 3 hrs.
This course acquaints the student with the contemporary health system in the U.S., its various components, and their functional relationships to each other. Serves as a description of common individual health problems of special significance to young adults, how these health problems are manifested clinically and what constitutes appropriate management.

160 History and Principles of Physical Education 3 hrs.
An introductory course to orient the student to the field of health, physical education, and recreation. The course includes a broad look at the history, principles, and philosophy of the profession. Emphasis is placed on concepts of learning and education, recreation and health education, athletics, professional organizations, and physical education as a career.
History

Professors: Roberts; Associate Professors: Salley, White (chairman); Assistant Professors: Boucher, Hull, Pearson, Shields; Instructor: Williams

General Education Requirements

Transfer students and students at UAH who have not completed HY 101 and 102 before reaching junior standing may substitute HY 391 and 392 in their General Education Requirements as well as in a history major. Students of senior standing may not take HY 101 or HY 102.

Area of Concentration (AOC) With History Major

A student who wishes to major in history must include in his academic program a minimum of 36 semester hours in history, including HY 101-102 (a part of the General Education Requirements), HY 221-222, and a minimum of 15 semester hours in courses numbered 300 or above (one of which must be HY 590 or 591). A student wishing to concentrate in American history is required to take 6 semester hours in courses other than American history in addition to HY 101-102, preferably not HY 391 or 392. A student choosing to concentrate in European history is required to take 6 semester hours in American history above HY 221-222. For the purposes of this requirement, Latin American history courses, except HY 237, Colonial Latin America, are considered in the general field of American history.

A European history major who has substituted HY 391-392 for HY 101-102 is also required to take at least one course in medieval history.

The history major as defined above will form a part of an area of concentration which must include one of the following variations:

1. An established cluster drawn from one department now offering a major which includes a minimum of 21 semester hours, 6 hours of which must be numbered 300 or above;
2. A cluster drawn from a discipline other than those currently offering a major which includes a minimum of 21 semester hours, 6 hours of which must be numbered 300 or above;
3. A cluster drawn from two or more disciplines which include a minimum of 21 semester hours, 9 of which hours must be in courses numbered 300 or above.
A student majoring in history will find a variety of AOC's which will enable him to develop depth and breadth in history and some related areas chosen 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, Pre-professional and Pre-law 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 advisor and with the coordination of the Department Chairman.

Supportive History Clusters

A student interested in an established history cluster should include appropriate history courses involving a minimum of 21 semester hours and including 6 semester hours in courses numbered 300 or above. Appropriate history courses may also form a part of a cluster with other disciplines to support another major program. Such a cluster must be approved by the student's advisor in coordination with the Department Chairman and must meet the requirements established in (3) above.

Slavic Area Studies

The Department of History in conjunction with the Department of Modern Foreign Languages offers students desiring to concentrate in the culture, history, and language of Eastern Europe the opportunity to major in an inter-disciplinary program. The purpose of the Slavic Area Studies Program is to provide intensive training in preparation for careers in government, international business, graduate study, or related fields. A student majoring in this program will be required to develop his AOC in consultation with a faculty advisor. The program requires 18 hours of language classes and 18 hours of history classes beyond the general education requirements.

History (HY)

101 Origins and Development of the Contemporary World, Part I
   A general survey of the major western civilizations to 1648. Not open to seniors. 3 hrs.

101 Origins and Development of the Contemporary World, Part I
   (Tutorial) 3 hrs.
   Similar to HY 101. Students are held responsible for the full work of the course, but emphasis is given to developing the basic skills of historical study. Permission of history faculty required.

102 Origins and Development of the Contemporary World, Part II
   A general survey of the major Western Civilizations since 1648. Not open to seniors. 3 hrs.

102 Origins and Development of the Contemporary World, Part II
   (Tutorial) 3 hrs.
   Similar to HY 102. Students are held responsible for the full work of the course, but emphasis is given to developing the basic skills of historical study. Permission of history 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 hr. 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 hr. A study of 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. A general survey of the history of the United States from discovery of America through the Civil War and Reconstruction.

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

225 History of Alabama 3 hrs. A survey of 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. A survey of the history of the ancient Near East, Greece, and Rome. Prerequisite: HY 101-102 or approval of instructor.

230 The Medieval World 3 hrs. A survey of the history of Europe including Byzantium, from 500 to 1500. Prerequisite: HY 101-102 or approval of instructor.

237 Colonial Latin America 3 hrs. A study of the political, social, and cultural Spanish and Portuguese colonial systems and their development in America.

238 National Latin America 3 hrs. A general study of the peoples, cultures, and societies of Spanish and Portuguese America since Independence with attention to problems of Latin American cultural development and social change and their importance for North Americans.

247 English Constitutional History to 1603 3 hrs. An interdisciplinary course appropriate for students of history, government or literature. Attention will be given to the condition of society and the impact of ideas and social forces on historical developments and to 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. Additional things include 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. An analysis of 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. Prerequisite: HY 238 or approval of instructor.

341 Modern France 3 hrs.
A study of the 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.
An examination of modern German history from the Congress of Vienna in 1815 through the Second World War and Germany's role in current history. Consideration will be given to political, economic, and cultural factors in the development of the German nation. Prerequisite: HY 101 and 102.

345 History of Italy Since the Renaissance 3 hrs.
An analytical study of Italian civilization from the sixteenth century to the present with special emphasis on the geopolitical, economic and cultural factors of the Italian states, their emergence as the nation-state of the nineteenth century and its subsequent role in the twentieth century.

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

366 The Negro in Twentieth Century America 3 hrs.
A study of 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.
A general study of the social, cultural, religious, and intellectual life of the United States to the end of the Civil War. Prerequisite: HY 221 or approval of instructor.

370 Social and Cultural History of the United States Since 1865 3 hrs.
A general study of the social, cultural, religious, and intellectual life of the United States since the end of the Civil War. Prerequisite: HY 222 or approval of instructor.

373 Foreign Relations of the United States to 1890 3 hrs.
A general survey of foreign relations to 1890 with particular attention to the formation of traditional policies. Prerequisite: HY 221, 222, or approval of instructor.

374 Foreign Relations of the United States Since 1890 3 hrs.
A general survey of foreign relations with particular attention to departures from traditional policies and the backgrounds of current situations. Prerequisite: HY 221, 222, or approval of instructor.

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 with special attention to the multinational character of the Empire and its manifestation in political, economic, and cultural aspects of Russian life.

376 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.

391 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.
Europe Since 1815
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.

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 American Studies
A study of the evolution of a specific American cultural problem using polarities of experience as a method of approach (e.g., racism in America: black vs. white; the Machine in the Garden: industry vs. the pastoral ideal; the search for community: society vs. the individual). Prerequisite: HY 221, HY 222.

The Nineteenth Century South
An analysis of continuity and change in the nineteenth century South, stressing development, disruption, and reconstruction of the economic, social and political order. Prerequisite: HY 221, 222, or approval of instructor.

The South in the Twentieth Century
A study of the economic, social, and political readjustments of the late nineteenth century, and the vast changes in the South during the twentieth century. Prerequisite: HY 221, 222, or approval of instructor.

Constitutional History of the United States
A study in the 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. Prerequisite: HY 221, 222, or approval of instructor.

Colonial America to 1789
A study of the American colonies within the seventeenth and eighteenth century world as well as an examination of the American Revolution, the Confederation, and the ratification of the Constitution. Prerequisite: HY 221, 222, or approval of instructor.

The Emergence of the United States as a New Nation
An intensive study of the Revolutionary Era, the period of the Confederation and the development of the Young Republic.

Problems in American Foreign Relations Since 1939
An intensive study of selected problems in the light of ideological conflicts, domestic factors and the national interest. Same as PSC 439.

The Relations of the United States and the Far East
A study of the interrelationships of the United States with the Far East since 1784 with particular attention to China and Japan. Prerequisite: HY 221, 222, or approval of instructor.

The High Middle Ages, C. 1000-1300
A study of the political, economic, and cultural features of Europe at the time when medieval civilization was at its height. Prerequisite: HY 391 or approval of instructor.

Europe in the Seventeenth Century
A study of Europe from the Edict of Nantes to the Peace of Utrecht with major emphasis upon the Thirty Years' War and the ascendancy of France under Louis XIV. Prerequisite: HY 391 or approval of instructor.
477 The French Revolution and Napoleon, 1789–1815. 3 hrs.
An intensive study of European ideas and institutions from the opening stages of the
French Revolution through the demise of the Napoleonic Empire.

478 Nineteenth Century Europe, 1815-1914 3 hrs.
A study of the major political, social, economic, and intellectual developments in Europe
from the Congress of Vienna to World War I.

528 Jeffersonian-Jacksonian America 3 hrs.
A study of the gradual democratization of the political system, the growth of
nationalism, economic and geographical expansion, and the debate over the direction of
national growth dramatized in economic, political and cultural sectionalism. Prerequi-
site: HY 221, 222, or approval of instructor.

534 The Civil War and Reconstruction 3 hrs.
A study of the sectional struggle leading to secession of the South, and the political,
military, economic, and social aspects of Civil War and Reconstruction. Prerequisite: HY
221, 222, or approval of instructor.

537 The Foundations of Modern America, 1865-1914 3 hrs.
An intensive study of the expansion, industrialization and urbanization of the United
States, of the emerging political, economic and social problems, and of the Progressive
response. Prerequisite: HY 221, 222, or approval of instructor.

538 The United States in the Twentieth Century 3 hrs.
An intensive study of the modern domestic development and international role of the
United States with particular attention to the accelerating changes since 1945.
Prerequisite: HY 221, 222, or approval of instructor.

574 The Renaissance and Reformation 3 hrs.
A study of Europe during the Renaissance and Reformation with emphasis upon
political, social, economic, and cultural developments. Prerequisite: HY 391 or approval
of instructor.

576 The Age of Reason, 1713-1789 3 hrs.
An analysis of the intellectual, social, economic, and political developments in Europe
from the Peace of Utrecht to the outbreak of the French Revolution. Prerequisite: HY
391 or approval of instructor.

585 Twentieth Century Europe 3 hrs.
An examination of the major events in European history from the end of the First World
War in 1919 to the present. Political, economic, and cultural aspects will be included in
consideration of the interwar years, the Second World War, and the postwar world.
Prerequisite: HY 392 or approval of instructor.

590 Senior Seminar in American History 3 hrs.
A course in historiography, research and writing, and recent interpretations in the field
of American history. Open only to seniors who are majoring in, or who have a cluster in,
history.

591 Senior Seminar in European History 3 hrs.
A course in historiography, research and writing, and recent interpretations in the field
of European history. Open only to seniors who are majoring in, or who have a cluster in,
history.

598 Directed Readings in History 3 hrs.
A program of independent reading in one field of history, to be selected in consultations
with an advisor. Open only to seniors majoring in history.
Modern Foreign Languages

Professor: Penot; Associate Professor: O'Neal (chairman); Assistant Professors: Heller, Rettig, Stromecky, Traylor; Instructors: Hermann, Estell, Tate

French, German, Slavic, Spanish

The Department offers both a major and a minor program in French (FH) and German (GN), and cluster in Slavic (SL) and Spanish (SH).

Students with Previous Language Training

The Department of Modern Foreign Languages requires 6 credit hours earned at UAH in a class situation, regardless of the number of hours granted through exemption. (See exemption with credit possibilities below.) Transfer students from other universities and colleges need only complete the required 12 hours in foreign language. The 6 hours in residence rule does not apply to these students.

A student presenting two years or more of high school credit in a foreign language may not enroll for credit in a 100 level course in that language, unless placed at such a level by means of the University—administered placement test.

A student presenting two or more years of high school credit in a foreign language may enroll in a 100 level course for credit, upon demonstration of a lapse of time (which exceeds four years), between the high school experience and the initiation of the university experience.

Native or quasi-native speakers of a language are not permitted to enroll in any basic course, nor in the first conversation course on the 300 level in that language. Exceptions made only by Department Chairman.

Program of Studies

A foreign language major shall consist of 27 semester hours above the basic course sequence in a single language. For students beginning the language on the 101 level, this means a total of 39 semester hours.

A foreign language cluster shall consist of 12 semester hours above the basic course sequence in a single language. For students beginning the language on the 101 level, this means a total of 24 semester hours. The literature survey courses are required and the Department strongly recommends advanced conversation and advanced composition.

Exemption with Credit

The Department of Modern Foreign Languages, on the basis of a locally administered examination for students offering high school language study, grants from 0-9 credit hours, with no letter grade or quality points assigned. A student receiving the maximum of 9 credit hours will enroll in the 202 level of the language
and will also be required to take the first conversation course on the 300 level in order to satisfy the General Education Requirements for B.A., B.S. or BSBA degree. A fee per credit hour granted will be charged.

Native or quasi-native speakers of a language, on the basis of a personal interview and examination, may be granted from 0–18 credit hours, with no letter grade or quality points assigned, except for 6 hours at the 300 level. Language programs for these persons will be planned strictly under the supervision of a faculty member in the language. A fee per credit hour granted will be charged.

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 cluster.

**Modern Language (ML) Courses**

Courses coded under ML are language related courses, but courses taught in English. Therefore, such courses cannot count towards either major or minor requirements in a language, nor for language requirements for degree purposes.

**Area of Concentration (AOC) with French Major**

Required courses: FH 303, 304, 305, 306, 309; plus three courses on the 400 level and one elective from either the 300 or 400 level.

**Area of Concentration (AOC) with German Major**

Required courses: GN 311, 312, 316 or 317, 313, 314; plus three courses on the 400 level and one elective from either the 300 or 400 level.

**Area of Concentration (AOC) with Slavic Area Studies Major**

The Department of Modern Foreign Languages, in conjunction with the Department of History, offers students desiring to concentrate in the culture, history and language of Eastern Europe the opportunity to major in an inter-disciplinary program. The purpose of the Slavic Area Studies Program is to provide intensive training in preparation for careers in government, international business, graduate study, or related fields. A student majoring in this program will be required to develop his AOC in consultation with a faculty advisor. The program requires 18 hours of history classes beyond the general education requirements for a total of 24 hours, and 30 hours of Russian language, including the basic courses.

**Area of Concentration (AOC) Models**

A student majoring in a foreign language will find a variety of AOC’s which will enable him to develop depth and breadth in the major and related areas; other languages, other 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.
Cluster

An AOC requires a cluster (see definition and regulations elsewhere in catalogue). Possible clusters for foreign language majors are available in the Modern Foreign Languages Office. See program of studies for foreign language cluster.

Modern Languages (ML)

319 German Masterpieces in English Translation 3 hrs.
Prerequisite: EH 206 or approval of Department Chairman.

320 General Comparative Linguistics 3 hrs.
French, German, Russian, and Spanish pronunciation and grammatical structure are compared with that of English. Special attention given to those areas where the foreign language and English differ. Highly recommended for teachers. Prerequisite: FL 202 or EH 200 level or approval of Department Chairman.

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

French (FH)

101 Elementary French 3 hrs.

102 Elementary French 3 hrs.
Prerequisite: FH 101.

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

202 Intermediate French 3 hrs.
Prerequisite: FH 201.

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

304 Advanced French Composition 3 hrs.
Primarily a composition course with emphasis on idiomatic expression. Prerequisite: FH 202 or 303 or approval of Department Chairman.

305 Survey of French Literature 3 hrs.
A study of French literature from the medieval period through the eighteenth century. Reading of selections from the important authors, lectures, and reports. Prerequisite: FH 202 or approval of Department Chairman.

306 Survey of French Literature 3 hrs.
A continuation of FH 305. French literature from 1800 to the present. Prerequisite: FH 202 or 305 or approval of Department Chairman.

307 French Civilization 3 hrs.
Prerequisite: FH 202.

309 Explication de Texte 3 hrs.
A study of methods of textual analyses, employing selected readings from French masterpieces in prose and in poetry, with attention to literary movements. Prerequisite: FH 202 or approval of Department Chairman.
402 Epic and Chivalric Poetry 3 hrs.
A study of outstanding epic and chivalric poems. The list of authors on the program may
vary from time to time (Chanson de Roland, Marie de France, Adenet le Roy, Chrestien
de Troyes, Beroul, Thomas, etc.). Prerequisite: FH 305-306 or approval of Department
Chairman.

403 Sixteenth Century French Literature 3 hrs.
A study of the intellectual, philosophical, and aesthetic trends and developments in
Renaissance France, utilizing representative works of the period. Prerequisite: FH
305-306 or approval of Department Chairman.

404 Seventeenth Century French Literature 3 hrs.
A study of masterpieces of French classic authors. Concepts from Malherbe, Boileau, La
Fontaine, Pascal. With emphasis on the theater of Corneille, Racine, Moliere.
Prerequisite: FH 305-306 or approval by Department Chairman.

405 The Century of Enlightenment 3 hrs.
A comprehensive study of this important century in French thought and writing.
Representative works; Voltaire, Diderot, Montesquieu, Rousseau, Beaumarchais,
Marivaux, L'Abbe Prevost, Chenier, et al. Prerequisites: FH 305, 306, or approval of
Department Chairman.

406 Nineteenth Century French Novel 3 hrs.
A study of the principal novelists of the nineteenth century – Balzac, Stendahl,
Flaubert, Zola, Daudet. Prerequisite: FH 305-306 or approval of Department Chairman.

407 Nineteenth Century French Drama 3 hrs.
A survey of 19th Century French drama, beginning with Marivaux and Beaumarchais
(18th Century precursors), covering representative works by: Hugo, Musset, Dumas fils,
Augier, Becque, Maeternick, etc. Prerequisite: FH 305, 306 or approval of Department
Chairman.

408 Twentieth Century French Novel 3 hrs.
A study of the most influential French novelists from the beginning of the century to
the present day. From Proust to Claude Simon. Prerequisites: FH 305, 306, or approval
of Department Chairman.

409 Twentieth Century French Drama 3 hrs.
A study of the most influential French dramatists from the beginning of the century to
the present day – Claudel to Adamov. Prerequisite: FH 305-306 or approval of
Department Chairman.

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.

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

202 Intermediate German II 3 hrs.
Prerequisite: GN 201.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
<th>Prerequisite(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>214</td>
<td>Intermediate Scientific German</td>
<td>3 hrs.</td>
<td>Prerequisite: GN 201.</td>
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<td><strong>NOTE:</strong> The course may be taken instead of GN 202 or following GN 202 as an elective.</td>
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</tr>
<tr>
<td>311</td>
<td>German Conversation</td>
<td>3 hrs.</td>
<td>Oral drills, pronunciation exercises, simple oral reports. Prerequisite: GN 202 or 214 or approval of Department Chairman.</td>
</tr>
<tr>
<td>312</td>
<td>Advanced German Composition and Usage</td>
<td>3 hrs.</td>
<td>Primarily a composition course with emphasis on idiomatic expression. Prerequisite: GN 202 or 214 or approval of Department Chairman.</td>
</tr>
<tr>
<td>313</td>
<td>Survey of German Literature</td>
<td>3 hrs.</td>
<td>A study of German literature from its beginning to 1785. Prerequisite: GN 202 or 214 or approval of Department Chairman.</td>
</tr>
<tr>
<td>314</td>
<td>Survey of German Literature</td>
<td>3 hrs.</td>
<td>A continuation of GN 313. German literature from the end of the eighteenth century to the present. Prerequisite: GN 202 or 214 or approval of Department Chairman.</td>
</tr>
<tr>
<td>316</td>
<td>German Culture</td>
<td>3 hrs.</td>
<td>Lectures and discussions on German cultural history. Prerequisite: GN 202 or 214 or approval of Department Chairman.</td>
</tr>
<tr>
<td>317</td>
<td>Advanced Conversational German</td>
<td>3 hrs.</td>
<td>Prerequisite: GN 202 or 214 or 311 or approval of Department Chairman.</td>
</tr>
<tr>
<td>410</td>
<td>German Literature of the Middle Ages</td>
<td>3 hrs.</td>
<td>A study of important heroic and courtly epics of the middle ages (Nibelungenlied, Parzival, Arme Heinrich, Iwein) and of chivalric poetry (Walter Von der Vogelweide, Wolfram Von Eschenback, Hartmann von Aue). Prerequisite: GN 313-314 or approval of Department Chairman.</td>
</tr>
<tr>
<td>412</td>
<td>Goethe, Schiller and Major Writers of 18th Century</td>
<td>3 hrs.</td>
<td>With focus on contributions of Goethe and Schiller to German literature, compared with significant works by contemporary writers of the 18th century—Lessing, Gellert, Klopstock, Herder, Wieland, Lenz, et al. Prerequisite: GN 313-314 or approval of Department Chairman.</td>
</tr>
<tr>
<td>413</td>
<td>German Romanticism</td>
<td>3 hrs.</td>
<td>A study of the romantic period in German literature with emphasis on fictional works with due consideration of philosophy and literary theory of German romanticism. Prerequisite: GN 313-314 or approval of Department Chairman.</td>
</tr>
<tr>
<td>414</td>
<td>The German “Novelle” From Goethe to Kafka</td>
<td>3 hrs.</td>
<td>A study of this important literary genre with emphasis on representative novellas of the nineteenth century (Goethe, Tieck, Hoffmann, Kleist, Grillparzer, Droste-Hulshoff, Keller, C. F. Meyer, Kafka and others). Prerequisite: GN 313-314 or approval of Department Chairman.</td>
</tr>
<tr>
<td>416</td>
<td>Twentieth Century German Literature</td>
<td>3 hrs.</td>
<td>Emphasizing the study of Post-War German literature, representative writings of Grass, Boell, Walser, Uwe Johnson, Lenz, Handke, et al. Also including Thomas Mann, Hermann Hesse and Franz Kafka. Prerequisite: GN 313-314 or approval of Department Chairman.</td>
</tr>
</tbody>
</table>
418 Modern German Drama 3 hrs.
Analysis and comparison of German dramas from the 19th century to present, showing development and diversity of modern German drama including Buechner, Grabbe, Hebbel, Hauptmann, Wedekind, Hofmannsthal, Kaiser, Brecht, Duerrenmatt, Frisch, Weiss, et al. Prerequisite: GN 313-314 or approval of Department Chairman.

419 German Lyric Poetry 3 hrs.
A study and interpretation of selected masterpieces of major German poets from the eighteenth to the twentieth century. Prerequisite: GN 313-314 or approval of Department Chairman.

420 Goethe’s Faust 3 hrs.
Goethe’s drama in the context of German and European literary tradition. Prerequisite: GN 313-314 or approval of Department Chairman.

421 The German Novel from Goethe to the Present 3 hrs.
A study of the novel of the 19th and 20th centuries; representative works of Stifter, Keller, Raabe, Fontane, Mann, Hesse, Kafka, Doeblin, Grass, Boell, Frisch, et al with emphasis on the "Erziehungsroman." Prerequisite: GN 313-314 or approval of Department Chairman.

424 History of the German Language 3 hrs.
A study of the linguistic development of German from the first written records through Middle High German to Early New High German. Attention to phonological and grammatical aspects as well as relevant dialectology and diachronic linguistic theory. Prerequisite: Two courses on the 300 level or approval of Department Chairman.

499 Independent Studies 1-3 hrs.
Prerequisite: approval of Department Chairman.

Slavic Russian (RN)

101 Elementary Russian 3 hrs.

102 Elementary Russian
Prerequisite: RN 101.

201 Intermediate Russian 3 hrs.
Prerequisite: RN 102.

202 Intermediate Russian 3 hrs.
Prerequisite: RN 201.

331 Russian Conversation and Composition 3 hrs.
Prerequisite: RN 202 or approval of Department Chairman.

332 Advanced Conversation and Composition 3 hrs.
Prerequisite: RN 331 or approval of Department Chairman.

335 Russian Culture and Civilization 3 hrs.
Prerequisite: RN 202 or approval of Department Chairman.

337 Survey of Russian Literature 3 hrs.
A study of Russian literature from its beginning to Pushkin. Prerequisite: RN 202 or approval of Department Chairman.

338 Survey of Russian Literature 3 hrs.
A continuation of RN 337. Russian literature from Pushkin to the present. Prerequisite: RN 202 or approval of Department Chairman.
<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
<th>Prerequisite(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>339</td>
<td>Russian Poetry</td>
<td>3 hrs.</td>
<td>A study of 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.</td>
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</tr>
<tr>
<td>431</td>
<td>History of the Russian Language</td>
<td>3 hrs.</td>
<td>Descriptive analysis and historical development of the phonology, morphology and syntax of present-day Russian. Prerequisite: RN 331, 332 or approval of Department Chairman.</td>
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</tr>
<tr>
<td>433</td>
<td>Major Writers of the Nineteenth Century</td>
<td>3 hrs.</td>
<td>A study of representative works from Pushkin, through Chekhov. Prerequisite: RN 337-338 or approval of Department Chairman.</td>
<td></td>
</tr>
<tr>
<td>439</td>
<td>Gogol</td>
<td>3 hrs.</td>
<td>A thorough study of Gogol's major works especially <em>Dead Souls</em>. Style ideology and literary technique of the author shall be the main points considered. Prerequisite: RN 337-338 or approval of Department Chairman.</td>
<td></td>
</tr>
<tr>
<td>440</td>
<td>Dostoevsky</td>
<td>3 hrs.</td>
<td>A detailed study and analysis of the major works by Dostoevsky, as regards style, ideology, philosophies and technique. Prerequisite: RN 337, 338 or approval of Department Chairman.</td>
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</tr>
<tr>
<td>499</td>
<td>Independent Studies</td>
<td>1-3 hrs.</td>
<td>Prerequisite: approval of Department Chairman.</td>
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<tr>
<td>531</td>
<td>Old Church Slavonic</td>
<td>3 hrs.</td>
<td>A phonological and morphological study of Old Church Slavonic with special emphasis on grammar, reading and translating of old chronicles. Prerequisite: RN 331, 332 or approval of Department Chairman.</td>
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<tr>
<td></td>
<td><strong>Spanish (SH)</strong></td>
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<tr>
<td>101</td>
<td>Elementary Spanish</td>
<td>3 hrs.</td>
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<tr>
<td>102</td>
<td>Elementary Spanish</td>
<td>3 hrs.</td>
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<td>SH 101</td>
</tr>
<tr>
<td>201</td>
<td>Intermediate Spanish</td>
<td>3 hrs.</td>
<td></td>
<td>SH 102 or placement</td>
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<tr>
<td>202</td>
<td>Intermediate Spanish</td>
<td>3 hrs.</td>
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<td>SH 201</td>
</tr>
<tr>
<td>323</td>
<td>Spanish Conversation and Pronunciation</td>
<td>3 hrs.</td>
<td></td>
<td>SH 202 or approval of Department Chairman</td>
</tr>
<tr>
<td>324</td>
<td>Advanced Spanish Grammar and Composition</td>
<td>3 hrs.</td>
<td>Recommended for teachers. Prerequisite: SH 202 or approval of Department Chairman.</td>
<td></td>
</tr>
<tr>
<td>325</td>
<td>Survey of Spanish Literature</td>
<td>3 hrs.</td>
<td>A study of Spanish literature from its beginning to 1700. Prerequisite: SH 202 or approval of Department Chairman.</td>
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</tr>
<tr>
<td>326</td>
<td>Survey of Spanish Literature</td>
<td>3 hrs.</td>
<td>A continuation of 325. Spanish literature from 1700 to the present. Prerequisite: SH 202 or 325 or approval of Department Chairman.</td>
<td></td>
</tr>
</tbody>
</table>
Cervantes: Don Quijote
A detailed study and analysis of this famous novel, the diverse interpretations of it and its transcendency as a work. Prerequisite: SH 325, 326 or approval of Department Chairman.

Golden Age Drama
A survey of the drama of the 16th and 17th centuries, with emphasis on the major dramatists: Lope de Vega, Tirso, and Calderon. Representative works. Prerequisite: SH 325, 326 or approval of Department Chairman.

Spanish Drama Since the Golden Age
A survey using representative plays from the 18th century to the present. Prerequisite: SH 325, 326 or approval of Department Chairman.

Spanish Novel Since 1800
Representative novelists and their works: Valera to the present. Prerequisite: SH 325-326 or approval of Department Chairman.

Spanish American Novel
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 326 or approval of Department Chairman.

The Generation of '98
A study of the literary and philosophical works of this important group of Spanish writers, using representative works. Emphasis on Miguel de Unamuno. Prerequisite: SH 325, 326 or approval of Department Chairman.

Independent Studies
Prerequisite: approval of Department Chairman.

Music
Professor: Pales; Associate Professors: Boyer (chairman), Cavanagh; Instructors: Whartenby, Wursten

The Bachelor of Arts degree in music is a program of 134 credit hours providing ample training and experience in performance, sufficient foundation in theory and literature, and is built upon the belief that a liberal arts base is the best preparation for musician and musician-teacher. The degree will provide the foundation most students need for graduate study and many professional musical opportunities. In order to minimize degree hours, a music major should choose a supporting cluster from among the disciplines represented in the General Education Requirements. There is opportunity for a great variety of discipline mixture with the music major, accommodating students with dual interests and abilities. More information and detailed programs of study are available in the Music Department office.

The music faculty expects a degree program with emphasis in music education to be approved before the fall of 1975. Interested students should consult with the Department Chairman.

Scholarships for music students are available: the Departmental Faculty Scholarships, the Kelly Zettle Memorial Scholarship, Huntsville Community Chorus
Vocal Scholarship, American Association of University Women Scholarship, and the Huntsville Music Study Club Scholarship. Auditions are held in early spring.

It is suggested that all music students, in consultation with a member of the music faculty, prepare a course of study suitable to their needs early in the freshman or transfer year. All students newly entering the music program must demonstrate appropriate competencies to the faculty in the areas of performance, theory, and literature. Any variation in the AOC listed below must be approved by the student’s advisor in coordination with the Department Chairman.

Bachelor of Arts Degree in Music

I. General Education Requirements 44-52 hrs.
General Education Requirements for the B.A. degree are listed in the Academic Information section. It is recommended that philosophy be chosen for the social science requirement and French or German for the language requirement.

II. Area of Concentration (AOC) 70 hrs.
A. Major (music performance emphasis)
   MU 14 - 4-3 Principal Instrument 16
      (4 years; 8 hrs. upper level)
   MU 10 - 2-0 Secondary Instrument 4
      (2 years)
   MU 101, 102, 103, 201, 202 Theory-Harmony 15
   MU 110 Introduction to Music Literature 3
   MU 311, 312 Music History 6
   MU 401 20th Century Materials and Techniques 3
   MU 327 Conducting 2
      Music Elective 2
      Ensemble 3-6
      Senior Recital 0
   54-57

B. Cluster (should be a discipline represented in fulfilling General Education Requirements) 13-16

III. Electives (outside of AOC) 12-20 hrs.
Minimum Total Hours 134 hrs.

Students may elect an emphasis in music literature rather than performance. If desired, studio instruction will be limited to 12 hours (rather than 20 hours) in one instrument, and be replaced by 8 hours of appropriate upper level courses. The Senior Recital will be replaced by another senior project.

One ensemble is required each term enrolled as a full-time music major to a minimum of 12 terms for graduation. However, only 3 to 6 hours of ensemble credit may be counted toward the degree, depending upon the discipline chosen for the cluster.
Music majors are required to attend at least six approved concerts per term; music minors must attend three.

Thirty percent (41 hours) of the degree requirements must be upper-level courses.

**Cluster in Music**

Students may cluster music courses as a supportive study (minor) to their major discipline area. A selection of combinations with majors in other disciplines are on file in the Music Office, or students may formulate their own with the approval of representative faculty advisors from the departments involved. Generally, 25 hours of music is necessary (3 hours upper level), usually including the following courses:

- **Studio Instruction 1-0 and 2-0 (6 terms)**: 4 hours
- **Music Theory 101, 102, 103**: 9 hours
- **Introduction to Music 110**: 3 hours
- **Music History 312**: 3 hours
- **Ensemble**: 6 hours
- **Total**: 25 hours

Students should note that 30% of their degree requirement hours must be upper-level credits.

**Music (MU)**

- **100 Fundamentals of Music**
  - 3 hrs.
  - Basic music presented in a practical way for the student who has little or no musical training. Explores the mechanical aspects of music—clefs, notation, scales, intervals, rhythm, etc., with some practice in writing and the harmonizing of melodies. This course serves as a remedial course for students who expect to major in music; such students will not receive degree credit for this course.

- **101 Theory of Music I**
  - 3 hrs.
  - Designed to develop fundamentals of basic musicianship through practical as well as theoretical studies. Emphasis on the development of skills in ear-training, sight-singing, keyboard and written harmony, and formal analysis. Prerequisite: approval of instructor.

- **102 Theory of Music II**
  - 3 hrs.
  - A continuation of MU 101. Prerequisite: MU 101.

- **103 Theory of Music III**
  - 3 hrs.
  - A continuation of MU 102. Prerequisite: MU 102.

- **109 Creative Dance (Basic Modern Technique)**
  - 1 hr.
  - Exploring time and space through movement. Developing proper body placement, control and agility while stimulating creative thinking.

- **110 Introduction to Music**
  - 3 hrs.
  - An exploration of ideas and issues in various types of Western music through reading, listening and discussion.

- **111 American Folk Music and Jazz**
  - 3 hrs.
  - An introductory study of the history and development of American folk music and jazz. Special attention is given to current developments.
Advanced Theory of Music IV  
Continuation of studies in MU 101-103 on a more advanced basis. Prerequisite: MU 103.  
3 hrs.

Advanced Theory of Music V  
Continuation of MU 201. Prerequisite: MU 201.  
3 hrs.

Contemporary Dance Techniques  
A concentration on movement to assist the student in achieving the kind of flexibility, physical grace, and coordination required of a dancer. Prerequisite: audition or approval of instructor.  
1 hr.

Environmental Dance (offered summer only)  
Opportunity to physically and psychologically interact with different environmental settings. This experience will be evaluated and interpreted in classroom and on stage. Prerequisite: two terms of Creative Dance or approval of instructor.  
1 hr.

Teaching Music in the Elementary School  
For elementary education teachers or prospective teachers not trained in music. Prepares one to teach music in the classroom through experience in singing, reading, planning and presentation.  
3 hrs.

Analysis of Music Form  
An extensive study of representative small and large compositions of the sixteenth through the twentieth centuries for structure and form. Prerequisite: MU 103, 110, or approval of instructor. Offered upon demand.  
2 hrs.

History of Music I  
A survey of the development of music as an art in Western civilization to 1750. Emphasis is given to representative musical works and style to the understanding of musical concepts in the light of their historical background. Prerequisite: MU 103, 110, or approval of instructor.  
3 hrs.

History of Music II  
A survey of the development of music as an art in Western civilization from 1750 to the present. Emphasis is given to formal and stylistic problems through the study of representative works and an understanding of specific musical concepts in light of their historical and general cultural context. Prerequisite: MU 103, 110, or approval of instructor.  
3 hrs.

Survey of a Musical Form  
Topic varies. A study of a musical form from its origins to the present time. Prerequisite: MU 202, and 311 or 312.  
2 hrs.

Piano Pedagogy  
A presentation of the materials, techniques and practices used in the teaching of beginners and students through lower advanced grades of piano; combined with practical experience. Prerequisite: approval of instructor. Offered upon demand.  
2 hrs.

Piano Technology  
A practical course for pianists designed to provide an understanding of the development of keyboard instruments, equal temperament tuning, and piano action regulation and repair.  
1 hr.

Conducting  
Basic techniques of choral and instrumental conducting. Prerequisite: MU 103 or approval of instructor.  
2 hrs.
20th Century Materials and Techniques
An introduction to the 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.

Piano Literature
Survey of music for string keyboard instruments from the pre-pianoforte period to the present, including representative works from all periods. Prerequisite: MU 202, 312 or permission of instructor.

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

Advanced Conducting
Further development of conducting techniques and communication with an emphasis on score reading of instrumental and choral-instrumental compositions. Includes a study of basic instrumentation. Prerequisite: MU 327. Offered upon demand.

Studio Instruction

Students must fill out a Request for Studio Instruction card obtained in the Music Office prior to each term enrolled. All beginning and transfer students who plan to take private instruction for music credit are required to demonstrate their level of proficiency to the instructor prior to registration.

To advance to the next one hundred level of instruction (e.g., 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. 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 section on Fees). Weekly lessons are normally sixty minutes in length.

Attendance at the monthly Student Recital Program is required of all students taking Studio Instruction. A student can be excused only with the written permission of the Department Chairman.

Studio Instruction in Keyboard
For secondary instrument or non-music credit. May be repeated. Prerequisite: approval of instructor.

Studio Instruction in Keyboard
For secondary instrument credit. May be repeated. Prerequisite: MU 130 and approval of instructor.

Studio Instruction in Keyboard
For secondary instrument credit. May be repeated. Prerequisite: MU 230 and approval of instructor.

Studio Instruction in Keyboard
For secondary instrument credit. May be repeated. Prerequisite: MU 330 and approval of instructor.

For principal instrument music credit. Prerequisite: approval of instructor.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>140</td>
<td>Studio Instruction in Voice</td>
<td>2/3 hr.</td>
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<tr>
<td>240</td>
<td>Studio Instruction in Voice</td>
<td>2/3 hr.</td>
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<tr>
<td>340</td>
<td>Studio Instruction in Voice</td>
<td>2/3 hr.</td>
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<tr>
<td>440</td>
<td>Studio Instruction in Voice</td>
<td>2/3 hr.</td>
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<tr>
<td>150</td>
<td>Studio Instruction in Strings</td>
<td>2/3 hr.</td>
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<tr>
<td>250</td>
<td>Studio Instruction in Strings</td>
<td>2/3 hr.</td>
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<tr>
<td>350</td>
<td>Studio Instruction in Strings</td>
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<tr>
<td>450</td>
<td>Studio Instruction in Strings</td>
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<tr>
<td>151</td>
<td>152, 153, 251, 252, 253, 351, 352, 353, 451, 452, 453</td>
<td>1-1/3 hrs.</td>
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<tr>
<td>160</td>
<td>Studio Instruction in Woodwinds</td>
<td>2/3 hr.</td>
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<tr>
<td>260</td>
<td>Studio Instruction in Woodwinds</td>
<td>2/3 hr.</td>
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<tr>
<td>360</td>
<td>Studio Instructor in Woodwinds</td>
<td>2/3 hr.</td>
</tr>
<tr>
<td>460</td>
<td>Studio Instruction in Woodwinds</td>
<td>2/3 hr.</td>
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</tbody>
</table>
Studio Instruction in Brass
For secondary instrument or non-music credit. May be repeated. Prerequisite: approval of instructor.

2/3 hr.

Studio Instruction in Brass
For secondary instrument credit. May be repeated. Prerequisite: MU 170 and approval of instructor.

2/3 hr.

Studio Instruction in Brass
For secondary instrument credit. May be repeated. Prerequisite: MU 270 and approval of instructor.

2/3 hr.

Studio Instruction in Brass
For secondary instrument credit. May be repeated. Prerequisite: MU 370 and approval of instructor.

2/3 hr.

172, 173, 271, 272, 273, 371, 372, 373, 471, 472, 473
Studio Instruction in Brass
For principal instrument music credit. Prerequisite: approval of instructor.

1-1/3 hrs.

Ensembles

The several UAH music ensembles are open to all students of the University, some requiring an audition. Ensemble participation is essential for all music majors and minors, and an appropriate ensemble should be selected each term one is enrolled in the University. A maximum of 6 semester hours in ensemble courses (MU 190-199) may be applied as credit toward total degree requirements in any discipline program; however, students may continue to enroll and repeatedly participate in ensembles throughout their University tenure.

UAH Choir
Mixed voices singing the serious choral repertoire.

1 hr.

Premier Singers
Mixed voices singing "pop" and folk music.

1 hr.

Huntsville Village Singers
Select, small ensemble of mixed voices. Open to all students of the University by audition.

1/2 hr.

Summer Chorus
Mixed voices singing a variety of choral music.

1 hr.

Music for Awhile Ensemble
Solo/ensemble performance, specializing in early and contemporary music. Normally offered winter term only.

1 hr.

Chamber Ensembles
Discussion, evaluation and performance of literature available for selected small musical ensembles. Ensembles such as piano trios, quartets, quintets, string quartets, woodwind, brass, percussion, and vocal ensembles.

1 hr.

Summer Band
Rehearsal and performance of a variety of music for the concert band. By audition with conductor.

1 hr.

Huntsville Symphony Orchestra
The Civic Symphony of some seventy-five players with international guest artists. Major symphonic, operatic, and choral literature is performed. By audition with conductor.

1 hr.
Philosophy

Instructor: Burns

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

It is recommended that beginning students take PHL 101. Prerequisite requirements will occasionally be waived for students interested in particular branches and/or periods of philosophy. Such requests must be approved by the instructor.

Supportive Philosophy Clusters

Students interested in a philosophy cluster are required to take at least 21 semester hours in philosophy including at least 6 semester hours in courses numbered 300 or above. Recommended clusters are available from the philosophy faculty upon request.

Appropriate philosophy courses may also be used to form part of a cluster with other disciplines. Such a cluster must include at least 21 semester hours including at least 9 semester hours in courses numbered 300 or above and must be approved by the philosophy faculty.

Philosophy (PHL)

101 Introduction to Philosophy 3 hrs.
An introduction to the fundamental problems of experience.

102 Introduction to Logic 3 hrs.
An introduction to the methodology of correct reasoning.

201 History of Western Philosophy 3 hrs.
From the earliest Greek philosophers to Plato: an introduction to the presocratic philosophers, Socrates and Plato, with emphasis on Plato.

202 History of Western Philosophy 3 hrs.
From Aristotle to the Renaissance: an introduction to such philosophers as Aristotle, the Stoics, the Epicureans, Saint Augustine and Thomas Aquinas, with emphasis on Aristotle. Prerequisite: PHL 101, or one course in the history of philosophy, or approval of instructor.

203 History of Western Philosophy 3 hrs.
The seventeenth century: an introduction to such philosophers as Descartes and Spinoza. Prerequisite: PHL 101, or one course in the history of philosophy, or approval of instructor.
The following courses are open to students who have at least junior standing or have completed at least 6 hours of philosophy or are approved by the instructor.

304 History of Western Philosophy
The eighteenth century: an introduction to such philosophers 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
Kant and the nineteenth century: an introduction to such philosophers as Kant, Hegel and Nietzsche. Prerequisite: PHL 101 and one course in the history of philosophy, or approval of instructor.

310 Contemporary European Philosophy
An introduction to some 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
An introduction to some 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
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
Non-symbolic inductive logic, including some problems of the philosophy of science. Prerequisite: PHL 102.

332 Epistemology
A critical investigation of some of the 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
A critical investigation of some of the fundamental problems of reality, such as appearance and reality, substance and universals, matter and life, mind and body, space and time, causality, necessity and freedom. Prerequisite: 9 hours of philosophy including PHL 101 or approval of instructor.

352 Ethics
An investigation of some of the 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 Introduction to Political Philosophy
The fundamental issues of politics as treated by some representative thinkers of the Western world. Same as PSC 362.

385 Selected Topics in the History of Philosophy
More intensive examination of particular problems, periods or movements in the history of philosophy. Prerequisite: to be determined in accordance with the content of the course.
Political Science

Assistant Professors: Brinkman, Rainey, White (chairman); Instructor: Schiltz

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, 231 (statistics), and a minimum of 15 semester hours in courses numbered 300 or above, two of which must be PSC 300 and 499.

A student developing an area of concentration with a political science major must choose a supportive cluster consisting of 21-30 semester hours of courses drawn from one or a combination of disciplines other than political science. Supportive clusters drawn from one discipline must include a minimum of six semester hours in courses numbered 300 or above. Clusters combining two disciplines must include at least one upper-level course in one subject and two upper-level courses in the other.

Freshmen considering a major in political science should consult with a faculty advisor in the department during their freshman year. In most cases, it will be advisable for majors to enroll in 200-level courses when they have completed PSC 101. Some electives should be chosen from economics, history and sociology. General education requirements 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 at UAH.

Sophomores must file AOC declarations before the end of their sophomore year. The AOC provides the student an opportunity to develop an academic program which will meet his individual interests and objectives. Guidelines for curriculum planning in political science are available in the departmental office. These guidelines are designed to consider such intellectual and vocational interests as pre-law training, international studies, public service, graduate-school preparation, criminal justice, and integrated studies with the social sciences, humanities or environmental sciences.

Political Science (PSC)

101 American Government 3 hrs.
A survey of the principles, institutions, and practices of American national government.

A survey of selected problems encountered by governmental units in areas of foreign and domestic policy such as defense, agriculture, business regulation, education, civil rights, and social welfare. Prerequisite: PSC 101.

201 Southern Politics 3 hrs.
An examination of the nation's most distinctive political region with consideration given to both state and national politics. Prerequisite: PSC 101.
202 Urban Politics
An introduction to the study of urban politics in America with attention given to urban environment, governmental forms, power structures, and policy outputs. Prerequisite: PSC 101 or approval of the instructor.

205 Western European Constitutional Systems
An examination of the political systems of Great Britain, France, and West Germany. Prerequisite: PSC 101 or approval of the instructor.

231 Applied Statistics for Social and Behavioral Science
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 "t" distribution. Prerequisite: college algebra or approval of instructor.

247 English Constitutional History to 1603
An interdisciplinary course appropriate for students of history, government, or literature. Attention will be given to the condition of society and the impact of ideas and social forces on historical developments and to the origins and evolution of English governmental and legal institutions such as common law, parliament, the judiciary, and national administration. Same as HY 247.

248 English Constitutional History Since 1603
A continuation of PSC 247. Additional themes include the impact of revolutions and industrialization upon English society, the expansion of English liberties, and the development of the cabinet, political parties, and the welfare state. Same as HY 248.

271 Principles of Public Administration
An examination of administrative principles and practices in public organizations and agencies. Prerequisite: PSC 101.

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

300 Political Analysis
An examination of political science and the philosophy and logic of scientific inquiry. Attention will be given to data and bibliographic sources and to useful techniques in data analysis, including an introduction to simple computing for political scientists. Prerequisite: 9 hours in political science. May be taken before PSC 231. Required of all students majoring in political science.

305 Totalitarian Governments
An examination of the nature of totalitarianism and a study of political practices, ideologies, and behavior in selected communist and non-communist countries.

313 American Federalism
An analysis of the functioning and importance of federalism as an aspect of the American political system. Consideration is given to the role of the states as partners in the federal arrangement and to their capacity to act as effective units of government.

315 Introduction to International Politics
An examination of the basic factors underlying the conduct of international relations focusing upon the evolution of the present state system. Special attention is given to the problems of balance of power, bi-polarity, sub-systems, and diplomacy.

325 The politics of Change in the Non-Western World
An examination of the political process in the new nations of Asia and Africa. Attention
is given to the development of adequate political processes to implement economic and
social change and to overcome general problems relating to traditionalism and ethnic and
tribal diversity.

327 The Comparative Development of China and Japan 3 hrs.
A comparative examination of the political and economic development of the major East
Asian powers in the twentieth century. For China attention is given to Mao-Tse-Tung’s
rise to power, the Chinese Communist Party, the political culture of Maoism, and
Chinese ideology. For Japan emphasis is given to Japan’s rise as a world power, the
degeneration of politics into fascism, post-war recovery and political change
Prerequisite: PSC 325 recommended but not required.

333 International Law and Organization 3 hrs.
An examination of the contribution of international law and organization to world order
since World War II. Emphasis is given to the role of the United Nations in the third world
and to the political and sociological origins of international law and its application to
selected contemporary problems.

339 Mass Political Behavior 3 hrs.
An examination of the nature and causes of political activity in mass electorates, the
dynamics of the decision to vote and who to vote for, and the mediating effects of
election law. Emphasis on American presidential elections.

340 Political Socialization 3 hrs.
A study of the development of attitudes and behavior patterns relevant to politics.
Topics include developmental models, belief systems, consequences for political
institutions. Data emphasizes mass publics and single elite actors.

357 The American Legislative Process 3 hrs.
An examination of the American legislative process with attention given to the
institutional setting and process of decision-making, recruitment and socialization of
legislators, influences on legislative decision-making, and the relationship between
legislatures and the remainder of the political system.

358 The American Presidency 3 hrs.
An examination of the role of the President in the American political system. Special
emphasis is placed upon the internal functioning of the executive branch of government
through an analysis of the structure and techniques of the national administration.

359 Social Foundations of Revolutionary Change 3 hrs.
An examination of the role of revolution, violence, and extremist politics in the social
and political process. Although a comparative perspective will be utilized, the major
focus will be on American social movements. Same as SOC 359.

362 Introduction to Political Philosophy 3 hrs.
A study of the fundamental issues of politics as treated by some representative thinkers
of the western world. Same as PHL 362.

363 Modern Political Ideologies 3 hrs.
An examination of political ideologies in the twentieth century such as nationalism,
liberalism, democratic socialism, facism, Marxism and its variants.

364 American Political Theory 3 hrs.
An examination of the main currents in American political thought from its European
ancestors to contemporary times.

371 American Constitutional Law 3 hrs.
An examination of the policy-making role of the supreme court in the American political
system, viewed through analysis of leading cases interpreting the constitution.
372 Civil Liberties
An examination of judicial interpretations of contemporary questions involving the rights of individuals and the limits of freedom of action in American society.

384 The Politics of Community Health
An assessment of the position of politics as a factor influencing the health of the American citizen. The role of government in public health policy-making and delivery is considered, and nongovernmental health agencies are viewed in their political aspects. The differential impact of public health policy is explored. Prerequisite: PSC 101.

Courses listed below are open to students who have completed 15 hours of political science or who have senior standing.

405 The Commonwealth of Nations
A study of the development and organization of the British Commonwealth with particular emphasis upon Canada, Australia, New Zealand, and South Africa. PSC 205 recommended but not required.

410 Local Government and Metropolitan Problems
An examination of the structure and difficulties of local government in metropolitan areas, with emphasis upon the relationship between political processes and problems of the contemporary metropolis. Prerequisite: PSC 202 or permission of the instructor.

427 Government and Crisis in Sub-Saharan Africa
An examination of the development of government in tropical Africa since the end of colonialism. Pan-Africanism, militarism, tribal and ethnic diversity, and the struggle against colonialism in southern Africa are among the topics discussed. Prerequisite: PSC 325 or permission of the instructor.

472 The American Judicial Process
A study of the American Judiciary with attention given to the institutional setting and the process of litigation, recruitment and political socialization of judges, influences and limitations on judicial decision making, and the impact of judicial decisions within the political system.

493 Advanced International Politics
An intensive examination of the theoretical approaches to the study of international politics with a focus on systems theory, defense planning, and game theory. A simulation game is an integral part of the course. Prerequisite: PSC 315.

496 Comparative Politics of Race
An examination of the role of the race factor in contemporary political systems through the comparative study of South Africa, the United States, and Portuguese Africa. Prerequisite: PSC 325 or permission of the instructor.

499 Seminar in Political Science
A consideration of selected problems in political science. Open only to seniors. Required of all students majoring in political science.

500 Directed Study in Political Science
A program of independent studies in an area of political science selected in consultation with a faculty advisor.

Public Administration (PA)
Courses listed below are open to advanced undergraduates and to graduate students in the administrative sciences program.
510 Administration of Major Federal Programs
A comparison of administrative techniques used in the administration of diverse federal programs such as Model Cities, Appalachia, Defense, and Agriculture. Emphasis is given to the patterns of administration created by the nature of the programs, their clientele, and administrative traditions.

512 Public Personnel Administration
3 hrs.
Purpose, functions, and processes of personnel management at the national, state, and local levels.

515 Budgetary Processes
3 hrs.
Governmental revenue and expenditure policies with emphasis on budget as a method of administrative and fiscal control. Prerequisite: PSC 271, EC 353. Same as EC 515.

560 Public Policy Determination
3 hrs.
A survey of political and economic implications of decision making at national, state and local levels.

568 Administrative Law and Regulation
3 hrs.
Judicial influences and controls on the exercise of administrative authority together with an analysis of governmental regulatory policies.

Psychology

Associate Professors: Coffield, Rogers, Sullins (chairman); Assistant Professors: Hays, James, Kirkpatrick

Area of Concentration (AOC) with Psychology Major

A student who majors in psychology must include in his academic program 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, 113, 204, 231, 426 and either one Experimental Psychology course and two Human Research courses, or two Experimental Psychology courses and one Human Research course.

The psychology major described above will form a part of an area of concentration which must include one of the following variations:

1. An established cluster drawn from one department now offering a major which includes a minimum of 21 semester hours, 6 hours of which must be numbered 300 or above.
2. A cluster drawn from a discipline other than those currently offering a major which includes a minimum of 21 semester hours, 6 hours of which must be numbered 300 or above;
3. A cluster drawn from two or more disciplines which include a minimum of 21 semester hours, of which 9 hours must be in courses numbered 300 or above.

A student planning to major in psychology is advised to take PY 103, 113, 204, and 231 before entering more advanced courses. At least as soon as these courses are completed the student should seek advice in planning an AOC from a faculty member in the Department of Psychology.
Supportive Psychology Clusters

A student using psychology as a supportive cluster (variation No. 1 above) must include 21 hours of psychology courses, including PY 103, 113, 204, and either one Experimental Psychology course and one Human Research course, or two Experimental Psychology courses. Appropriate psychology courses may also form a part of a cluster with other disciplines when that cluster can be shown to support the student's major. Such a cluster must be approved by the student's advisor in coordination with the relevant department chairman and must meet the requirements established in variation 3 above.

The 6 hour General Education Social Sciences requirement may be satisfied by taking both PY 103 and PY 113. PY 103 and PY 113 are both required for all students taking more than 15 hours in psychology. Either PY 103 or PY 113 may be taken first, but they may not be taken at the same time.

Psychology (PY)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hrs.</th>
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<tbody>
<tr>
<td>103</td>
<td>General Psychology</td>
<td>3</td>
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<tr>
<td></td>
<td>A survey of the empirical findings of the</td>
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<td></td>
<td>major areas of psychology, with primary</td>
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<tr>
<td></td>
<td>focus on general methodology, development,</td>
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<td></td>
<td>personality, abnormal and social</td>
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<td></td>
<td>psychology. (See note above).</td>
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<tr>
<td>113</td>
<td>Principles of Behavioral Analysis</td>
<td>3</td>
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<tr>
<td></td>
<td>(Same as PY 100 in previous catalogue.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>An introduction to fundamental principles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>governing the relationship between</td>
<td></td>
</tr>
<tr>
<td></td>
<td>behavior and the environment, with a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>primary focus on the principles of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>reinforcement, extinction,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>discrimination, and chaining. (See note</td>
<td></td>
</tr>
<tr>
<td></td>
<td>above.)</td>
<td></td>
</tr>
<tr>
<td>204</td>
<td>Laboratory Procedures</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>An introduction to behavioral research</td>
<td></td>
</tr>
<tr>
<td></td>
<td>techniques and descriptive statistics.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Includes laboratory. Prerequisite: PY 103,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>113. PY 231 is strongly recommended</td>
<td></td>
</tr>
<tr>
<td></td>
<td>before PY 204.</td>
<td></td>
</tr>
<tr>
<td>207</td>
<td>Principles of Personal Reconciliation</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>An examination of the application of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>basic principles in psychology to the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>origin and resolution of personal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>conflicts. Prerequisite: PY 103, 113.</td>
<td></td>
</tr>
<tr>
<td>231</td>
<td>Applied Statistics for Social and</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Behavioral Sciences</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Collection, classification, and</td>
<td></td>
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<tr>
<td></td>
<td>presentation of data; measures of</td>
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<tr>
<td></td>
<td>central tendency and dispersion;</td>
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<td></td>
<td>introduction to probability distribution</td>
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<tr>
<td></td>
<td>and sampling theory, confidence limits</td>
<td></td>
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<tr>
<td></td>
<td>and tests of significance, chi-square</td>
<td></td>
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<tr>
<td></td>
<td>and &quot;t&quot; distribution. Prerequisite: College</td>
<td></td>
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<tr>
<td></td>
<td>algebra or equivalent or approval of</td>
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<tr>
<td></td>
<td>instructor. (Same as EC 231, PSC 231 and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SOC 231.)</td>
<td></td>
</tr>
<tr>
<td>300</td>
<td>Experimental Psychology: Learning</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>The study of the role of reinforcement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>in the acquisition and modification of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>behavior. Both empirical and theoretical</td>
<td></td>
</tr>
<tr>
<td></td>
<td>material is considered. Includes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>laboratory. Prerequisite: PY 204.</td>
<td></td>
</tr>
<tr>
<td>304</td>
<td>Experimental Psychology: Perception and</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Judgment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A functional analysis of the processing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and interpretation of sensory information</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and of decision processes. Includes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>laboratory. Prerequisite: PY 204.</td>
<td></td>
</tr>
<tr>
<td>311</td>
<td>Individual Differences</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>A study of the factors, both learned and</td>
<td></td>
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<tr>
<td></td>
<td>innate, that lead to individually unique</td>
<td></td>
</tr>
<tr>
<td></td>
<td>patterns of behavior. Prerequisite: PY 103,</td>
<td></td>
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<tr>
<td></td>
<td>113.</td>
<td></td>
</tr>
</tbody>
</table>
313 Psychometrics
Theory and practice within psychological testing. Prerequisite: PY 103, 113, 231.

315 Developmental Psychology
The study of theory and issues pertinent to developmental processes in human organisms. Implications of both theory and empirical data will be emphasized. Prerequisite: PY 103, 113.

375 Social Psychology
An analysis of the fundamental principles of group structure. Emphasis is placed upon such topics as development of group solidarity, cohesion, intergroup conflict and cooperation, and the effects of different patterns of leadership. Prerequisite: SOC 100 or PY 103 or 113. (Same as SOC 375.)

390 Readings in Psychology
Supervised readings in depth in an area of particular interest to the student. Prerequisite: 15 hours PY and approval of instructor. May be taken twice for credit.

391 Special Topic in Psychology
Pre-announced special areas are studied via seminar discussion, laboratory work, or practicum. Prerequisite: 15 hrs. PY. May be taken twice for credit.

392 Special Topic in Psychology
Pre-announced special areas are studied via seminar discussion, laboratory work, or practicum. Prerequisite: 15 hrs. PY. May be taken twice for credit.

401 Personality
Various theories of personality are examined along with possible implications for research. Prerequisite: 15 hrs. PY.

410 Human Research: Developmental
The study of the effects of the environment upon cognitive and social development in both humans and animals. Includes laboratory. Prerequisite: PY 231, 315.

411 Human Research: Motivation
The study of the origin and utility of the concept of motivation. Includes laboratory. Prerequisite: PY 300 or 304.

412 Human Research: Personality
A study of the basic problems, procedures, and theoretical issues involved in personality research. Includes laboratory. Prerequisite: PY 300 or 304; and PY 401.

413 Human Research: Social Psychology
Empirical investigation of topics in social psychology, with consideration of various techniques for examining social influence and group-individual relationships. Includes laboratory. Prerequisite: PY 204 or SOC 300; and PY/SOC 375.

420 Seminar in Psychology
Student reports on psychological problems within a particular area are presented and discussed. Prerequisite: 15 hrs. PY and approval of instructor. May be taken twice for credit.

422 Individual Research
The student, with the advice of an instructor, will design and execute an original experiment in psychology. Prerequisite: One Human Research course, and approval of instructor.
426 History and Systems in Psychology 3 hrs.
A study of the history of psychology as it has led to the development of systematic study within the field. Prerequisite: 15 hrs. PY.

433 Abnormal Psychology 3 hrs.
An examination of major behavioral exceptionalities, with an emphasis on empirical findings. Prerequisite: PY 401 or approval of instructor.

436 Physiological Psychology 3 hrs.
A functional analysis of the neural and endocrinological systems underlying behavior. Prerequisite: 15 hrs. PY or approval of instructor.

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

502 Industrial Psychology 3 hrs.
Application of the basic principles of learning, motivation, and perception to typical industrial problems. Prerequisite: Approval of instructor.

503 Advanced General Psychology 3 hrs.
A comprehensive survey of the various major areas of psychology. Open only to senior psychology majors. Prerequisite: 24 hrs. PY and senior standing.

506 Language Development 3 hrs.
The study of stages of language development and techniques for stimulating language development and communication skills in the young child. Includes practicum.

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.
Presents the basic psychological principles concerning the control of human behavior and reviews current theoretical and experimental research in the field of behavior modification.

530 Statistics and Methodology 3 hrs.
An overview of experimentation, data presentation and analysis, and research report writing. Inferential statistics emphasized. Laboratory work included.

531 Individual Mental Testing: Stanford-Binet 3 hrs.
Various assessment techniques stressed, but particular emphasis is given to the Stanford-Binet. Both theory and practice are utilized. Includes laboratory. Prerequisite: Approval of instructor.

532 Individual Mental Testing: Wechsler 3 hrs.
Individual testing with the Wechsler tests, along with practical experience. Includes laboratory. Prerequisite: PY 531.

Sociology

Associate Professor: Tarter; Assistant Professors: MacDougall (acting chairman), Marks; Instructors: Donaghy, Herb

Area of Concentration (AOC) with Sociology Major
Requirements for a major are 36 semester hours of sociology including SOC 100, 102, 231, 300, and 465. A minimum of 15 hours should be taken in courses numbered 300 or above.

Up to six hours of the 36 hour major may be satisfied by related courses in disciplines other than sociology. These courses must be determined to relate to a specific area of interest within the major, and such courses may count toward the major only with the approval of the student’s faculty advisor.

A student developing a supportive cluster exclusively in sociology, with a major in another discipline, would be required to complete 21 hours of sociology courses including SOC 100 and 300. A minimum of 9 hours should be in courses numbered 300 or above. Supportive clusters which involve combinations of courses from disciplines other than sociology should be worked out with the advice of the sociology faculty.

Students in the elementary education program may develop an AOC of 27 hours in sociology. Recommended as especially useful for elementary teachers are SOC 100, 102, 106, 305, 315, 325, 330, 350, 375, 480, and 490.

Sociology (SOC)

100 Introduction to Sociology 3 hrs.
An introduction to the perspective methods, concepts, and general findings of the sociologist. Includes discussion of historical and conceptual development of sociology.

Courses listed below are open to students who have completed SOC 100 with exceptions as noted.

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

106 Marriage and the Family 3 hrs.
Analysis of the family as a social institution, its structure and function in contemporary societies, dating, marital interaction, the life cycle, and the socialization process.

200 Cultural Anthropology 3 hrs.
The basic study of the origin and development of man's ways of life. Special emphasis is placed on the analysis of preliterate societies.

231 Applied Statistics for Social and Behavioral Sciences 3 hrs.
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 "t" distribution. Prerequisite: college algebra or equivalent or approval of instructor. Same as EC 231 and PY 231.

250 Introduction to Social Work 3 hrs.
Designed to introduce the student to social case work, methods, functions, and services. Includes a survey of the principal fields and areas of social work. No prerequisite.

300 Research Methods 3 hrs.
Techniques and tools utilized in sociological research. Emphasis is placed on logic of proof, theory of measurement, and allied topics. SOC 231 will be helpful but not required.
305  Urban Sociology 3 hrs.
An analysis of the origin and growth of cities, demographic and spatial characteristics of communities, attitude and value systems in urban society, and the impact of urbanization on institutional structures.

310  Socialization 3 hrs.
An analysis of personality development in the social environment focusing primarily on childhood and adolescent socialization. Includes basic introduction to learning theory, comparative family child-rearing practices, and factors accounting for the development of achievement, aggression and self control in children. Prerequisite: SOC 100 or PY 100.

315  Population and Ecology 3 hrs.
Surveys the growth and distribution of world population and the environmental problems created in relation to population growth.

320  Criminal Behavior 3 hrs.
An analysis of theories of criminal behavior and criminal control procedures. Emphasis is placed on causation, criminal and chancery laws, and crime control by police and criminal or juvenile courts. Prerequisite: SOC 100 or approval of instructor.

325  The Sociology of Education 3 hrs.
A 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 ED 325.

330  Minority Groups 3 hrs.
Nature of minorities: status differentiation and group structure; institutional trends; intergroup relations. Prerequisite: SOC 100 or approval of instructor.

340  Special Topics 1-3 hrs.
Designed to cover special or non-traditional topics of current sociological interest. Title of course and number of hours credit, when offered, will appear in course schedule along with prerequisites deemed necessary for admission to the course. May be taken more than once for credit as long as subtitles differ.

350  Social Stratification 3 hrs.
The analysis of social class, social status, and social mobility. Emphasis placed on the study of social power and prestige. Close analysis is given to the differential opportunities and resultant behaviors of the upper, middle, and lower social classes.

359  Social Foundations of Revolutionary Change 3 hrs.
An examination of the role of the revolution, violence, and extremist politics in the social and political process. Although a comparative perspective will be utilized, the major focus will be on American social movements. Same as PSC 359.

375  Social Psychology 3 hrs.
Fundamental principles of group processes, social influence and group structure. Emphasis is placed upon such topics as development of group solidarity, cohesion, intergroup conflict and cooperation, communication, leadership, opinion, propaganda and suggestion. Prerequisite: PY 103 or 113.

385  Complex Organizations 3 hrs.
Basic introduction to the theory and structure of past and present complex organizations on the larger social structure. Included will be an analysis of military, industrial and political bureaucracies. Prerequisite: SOC 100. May be taken twice for credit with approval of instructor.
390  Readings and Individual Research  
Supervised readings and/or research in depth in an area of specialized interest to the student or the instructor. May be taken twice for credit with advisor’s approval. Prerequisite: at least nine hours in sociology including Sociology 100 and 300 and junior or senior standing.

400  Research in Sociology I  
The logic of social field research and development of appropriate tools for the collection of relevant data. Prerequisite: SOC 100, 231, 300 and invitation or approval of the instructor.

401  Research in Sociology II  
Designed to give advanced students actual experience in designing research projects, collection and analysis of data, and report writing. Prerequisite: SOC 100, 231, 300, 400, and invitation or approval of the instructor.

420  The Sociology of Corrections and Rehabilitation  
An analysis of the social variables involved in restructuring the behavior of the social offender. Special attention is given to the basic problems faced by correctional institutions. Prerequisite: SOC 100 and SOC 320.

440  Sociology of Religion  
The application of sociological principles to religious institutions focusing primarily on the function, development, and change of these institutions. Prerequisite: SOC 100 or approval of instructor.

450  Medical Sociology  
Surveys the relationship of sociology and social psychology to the field of medicine. It covers the role and status of medical and paramedical personnel in the United States, as well as analysis of health care delivery systems and problems encountered therein.

455  Industrial Sociology  
Social interaction in the industrial setting. Historical development of production systems, industrial roles and personality; labor-management relations. Prerequisite: SOC 100 or EC 112.

465  Development of Sociological Theory  
A study of the development of the discipline of sociology in terms of the major trends of sociological theory, past and present, and the major theoretical problem areas of the discipline. Includes study of the nature of sociological theory in relation to other disciplines. Prerequisite: SOC 231 and 300 and junior or senior standing.

480  Social Change and the Future  
Designed to cover the major theories of social change. Emphasis is placed upon the impact of technology on social institutions with a brief introduction to technology forecasting and assessment. The primary focus of the course is upon future development of social institutions.

490  Sociology of Poverty and Deprivation  
A sociological analysis of poverty and deprivation as variables in social life. Emphasis is placed on the social and psychological effects of deprivation and on the nature and effectiveness of programs to combat it. Offered on demand. Prerequisite: SOC 100 or approval of instructor.
Dean: J. Hoomani, Associate Professor of Mathematics
Assistant Dean: N. F. Audeh, Professor of Electrical Engineering

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 sciences 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 sciences, natural sciences, and statistics.

The faculty of the School of Science and Engineering will assist students in planning programs to meet various educational, vocational, and professional goals. Students may select programs of study to prepare for career opportunities in engineering, mathematics, life and physical sciences; to provide the 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: electrical engineering, industrial and systems engineering, mechanical engineering, and structural 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 chemistry, Master of Science in Engineering degree with several areas of specialization (see the 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, University, with one year residency at the Tuscaloosa campus.

Programs are administered by seven academic departments, the Office of the School of Science and Engineering and the Office of the School of Graduate Studies and Research. 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. Additional information concerning computer science, environmental science, and natural science programs are given in their respective sections in alphabetical order.

Biology

Associate Professors: Adams, Leonard (chairman), Rowland, Wilson; Assistant Professors: Campbell, Eley, Rosing

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.

All areas of concentration with a major in biology will include the core courses as indicated below. This does not apply to students in medical technology programs. The biology courses BY 113-114 must be taken or exempted but cannot be counted toward a major. The core courses will include one course from comparative anatomy and morphology (either botanical or zoological), and one course in physiology. General Genetics (BY 319) is highly recommended for all biology majors and minors. The additional hours elected to constitute the minimum of 30 semester hours required for a degree in biology may be taken in accordance with the individual student's goal. BY 592 is strongly recommended for students in curricula preparatory to graduate study.

For those students who elect premedical, predental, and medical technology programs, it is recommended that they consult the curriculum designed for these areas of vocational and academic pursuits.

Curricula I-IX are offered as models of appropriate programs designed to fulfill the University's degree requirements and achieve diverse goals in the biological sciences with various related areas of emphasis. Any curriculum may be modified to fit individual aims with the approval of the biology faculty.
Students placing in chemistry and mathematics courses below the level indicated in the curricula listed below are considered deficient in these areas. These students will be required to take the necessary courses to remove deficiencies. Courses taken to remove deficiencies cannot be counted toward the hours required in each curriculum but may be counted as elective hours.

A cluster in biology will consist of 21 hours to include BY 113, 114 (or equivalent) and at least 6 hours numbered 300 or above.

Curriculum I

B.A. Degree Appropriate for a Biology Major with an Associated Cluster in Social Sciences

| General Education Requirements (humanities and social sciences) | 30-36 |
| Biology core courses and biology electives | 30-32 |
| Chemistry-CH 101, 105, 131 | 8 |
| Physics-PH 101, 102 | 8 |
| Mathematics-MA 133, 153 | 6 |
| Humanities, social sciences, economics or associated cluster | 21 |
| Electives (education core if a Class B Secondary Professional Teaching Certificate is desired) | 27-30 |

Curriculum II

B.S. Degree for Secondary Teachers of Biology and Chemistry

| General Education Requirements (humanities and social sciences) | 30-36 |
| Biology core courses and biology electives | 30-32 |
| Chemistry-CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362 | 21 |
| Mathematics-MA 133, 153, 154 | 9 |
| Physics-PH101, 102 | 8 |
| Education core | 27 |
| Electives | 0-7 |

Curriculum III

B.S. Degree, Preparatory for General Graduate Study
<table>
<thead>
<tr>
<th>Semester</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>General Educational Requirements (humanities and social sciences)</td>
<td>30-36</td>
</tr>
<tr>
<td>Biology core courses and biology electives</td>
<td>30-32</td>
</tr>
<tr>
<td>Chemistry-CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362 (341 desirable)</td>
<td>21</td>
</tr>
<tr>
<td>Mathematics-MA 153, 154, 223</td>
<td>9</td>
</tr>
<tr>
<td>Physics-PH 101, 102</td>
<td>8</td>
</tr>
<tr>
<td>Electives</td>
<td>27-35</td>
</tr>
</tbody>
</table>

**Curriculum IV**

B.S. Degree with Chemistry Cluster, Preparatory for Graduate Study

<table>
<thead>
<tr>
<th>Semester</th>
<th>Hours</th>
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<tbody>
<tr>
<td>General Education Requirements (humanities and social sciences)</td>
<td>30-36</td>
</tr>
<tr>
<td>Biology core courses and biology electives</td>
<td>30-32</td>
</tr>
<tr>
<td>Chemistry-CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362, 341</td>
<td>24</td>
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<tr>
<td>Mathematics-MA 153, 154, 233, 244, 385</td>
<td>15</td>
</tr>
<tr>
<td>Physics-PH 101, 102, 201</td>
<td>11</td>
</tr>
<tr>
<td>Electives</td>
<td>12-20</td>
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</tbody>
</table>

**Curriculum V**

B.S. Degree with Physics-Chemistry Cluster, Preparatory for Graduate Study

<table>
<thead>
<tr>
<th>Semester</th>
<th>Hours</th>
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<tbody>
<tr>
<td>General Education Requirements (humanities and social sciences)</td>
<td>30-36</td>
</tr>
<tr>
<td>Biology core courses and biology electives</td>
<td>30-32</td>
</tr>
<tr>
<td>Chemistry-CH 121, 123, 125, 126, 331, 332, 335, 361, 362</td>
<td>17</td>
</tr>
<tr>
<td>Mathematics-MA 153, 154, 233, 244, 385</td>
<td>15</td>
</tr>
<tr>
<td>Physics-PH 101, 102, 201, 202, 203, 301</td>
<td>20</td>
</tr>
<tr>
<td>Electives</td>
<td>12-20</td>
</tr>
</tbody>
</table>

**Curriculum VI**

B.S. Degree, Premedical, Predental, Preveterinary (See chemistry section for an alternate premedical curriculum.)
General Education Requirements (humanities and social sciences) 30-36

Biology core courses and biology electives (to include either BY 317 or BY 390, 391, 392 and 542) 30-32
Chemistry-CH 121, 123, 125, 126, 223, 331, 332, 333, 335, 336, 341 (341 desirable) 20-23
Mathematics-MA 153, 154, 233 9
Physics-PH 101, 102 8
Electives 26-34

Curriculum VII

Medical Technology and Paramedical Services Leading to a B.S. Degree

A program satisfying the academic and clinical requirements for a degree in medical technology is offered as an option in biology. Students participating in this program must have completed all academic requirements (99 semester hours) as a prerequisite to acceptance for the clinical phase of the program. Academic work must meet all the requirements for graduation except for 29 hours and must include biology (30 hours beyond 113-114) and chemistry (20 hours beyond 101).

The clinical phase of the medical technology curriculum consists of a twelve month enrollment in a school of medical technology approved by the American Society of Clinical Pathologists (ASCP). During this time the student receives lecture and practical laboratory experience in clinical chemistry, hematology, clinical microscopy, serology, immunohematology, bacteriology, parasitology, and mycology.

Upon successful completion of the academic and clinical phase the participant will be awarded a B.S. degree and will be eligible for examination by ASCP for registry as a medical technologist. Students satisfactorily completing the program outlined below will be considered to have 30% or more of the course work at the 300 level or above.

<table>
<thead>
<tr>
<th>Semester Hours</th>
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<tbody>
<tr>
<td>General Education Requirements (humanities and social sciences) 30-36</td>
<td></td>
</tr>
<tr>
<td>Basic biology courses</td>
<td>16-18</td>
</tr>
<tr>
<td>Biology-BY 521, 569, 579</td>
<td>15</td>
</tr>
<tr>
<td>Chemistry-CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362</td>
<td>21</td>
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<tr>
<td>Mathematics-MA 133, 153, 154</td>
<td>9</td>
</tr>
<tr>
<td>Physics-PH 101, 102</td>
<td>8</td>
</tr>
<tr>
<td>Internship in an accredited school (or electives)</td>
<td>29</td>
</tr>
</tbody>
</table>
Curriculum VIII

B.S. Degree, Preparatory for Graduate Study in Biology-Mathematics (Biometrics)

| General Education Requirements (humanities and social sciences) | 30-36 |
| Biology core courses and biology electives | 30-32 |
| Chemistry-CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362 | 21 |
| Mathematics-MA 153, 154, 233, 244, 251, 352 or 353, 385 | 21 |
| Physics-PH 101, 102 | 8 |
| Electives | 14-22 |

Curriculum IX

B.S. Degree, Environmental Biology Emphasis, Preparatory for Graduate Study in Ecology or Environmental Science

| General Education Requirements (humanities and social sciences) | 30-36 |
| Biology-BY 221, 312, 319 | 11 |
| BY 431 or 432 | 4 |
| BY Electives |
| Two from BY 596, 597, 598, 599 | 2 |
| One from BY 278, 371, 522 | 5 |
| One from BY 513, 514, 585 | 4 |
| One additional biology course 300 level or above | 4 |
| Chemistry-CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362 | 21 |
| Physics-PH 101, 102 | 8 |
| Mathematics-MA 153, 154, 233 | 9 |
| Environmental Sciences-ES 102 | 4 |
| Computer Sciences-CS 113, 208 | 6 |
| Electives | 16 |
113 General Biology
A study of basic biological principles; cellular and subcellular structure and function; basic biological pathways (Glycolysis, Kreb's cycle, protein and fatty acid synthesis); photosynthesis (light and dark reactions); survey of the plant kingdom as well as introduction into the five basic kingdoms with emphasis on ontogeny of tissues and phylogenetic relationships of certain organisms in the plant kingdom. One lab per week.

114 General Biology
A continuation of the basic biological principles; survey of the animal kingdom with emphasis on structures and functions, taxonomy, origin and evolution of the animal kingdom; basic principles of genetics and ecology. One lab per week. Prerequisite: BY 113.

213 Human Ecology I
A fundamental course concerning the impact of the changing physical and biological environment upon man. Human Ecology I emphasizes physiological, anatomical, and genetic aspect. Not open to biology majors. Two 2-hour labs per week. Prerequisite: BY 113, 114 or NS 111, 112, 113 or equivalent.

214 Human Ecology II
The study of microbiological aspects of the internal and external environments of man includes epidemiological and immunological aspects. Not open to biology majors. Two 2-hour labs per week. Prerequisite: BY 113, 114 or equivalent.

221 General Microbiology
A fundamental course in microbiology which includes the cultivation and observation of micro-organisms and their relation to foods, water, industrial processes and disease. Two 3-hour labs per week. Prerequisite: BY 113, 114 or equivalent; CH 101 or 121 recommended. Should be taken no later than sophomore year.

238 Local Flora
Primarily a laboratory course to acquaint the student with basic taxonomical procedures and taxonomical determination of local angiosperms, primarily dicots. Prerequisite: BY 113

312 Principles of Ecology
The basic ecological principles controlling plant and animal populations. Includes the study of the development of ecosystems, communities and habitats. One 3-hour lab per week. Prerequisite: BY 113, 114; CH 121. Offered Spring Term.

317 Comparative Anatomy of the Vertebrates
A study of the morphology of vertebrate animals with emphasis upon the relationship of organs and systems and their phylogentic significance. Two 3-hour labs per week. Prerequisite: BY 114.

319 General Genetics
A study of the hereditary basis of all living organisms, including the structure and function of genes and gene products, reproductive processes, Mendelian principles, and modern genetic techniques and applications. Prerequisites: BY 114 and MA 105.

320 Genetics Laboratory
Practical applications of modern genetic techniques. Two 3-hour labs per week. Prerequisite or concomitant: BY 319.
371 Non-Vascular Cryptogamic Botany 5 hrs.
An 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 per week. Prerequisite: BY 113.

372 Biology of Vascular Plants 5 hrs.
Comparative anatomy and morphology of the vascular plants and their relationship in various phylogenetic lines of development. Vascular cryptogams as well as ferns, gymnosperms and angiosperms are studied. This is not a field course. Two 3-hour labs per week. Prerequisite: BY 113.

378 Invertebrate Zoology 5 hrs.
Phylogenetic consideration of the anatomy, morphology, tissues and organs of the invertebrate phyla with relationships to their habitats. Two 3-hour labs per week. Prerequisite BY 114 or approval of instructor. Offered Fall Term.

390 Cellular and Developmental Biology 3 hrs.
A course designed to provide students of the junior, senior and first year graduate level with a broad and comprehensive integrated approach to cellular and developmental biology through lectures, discussions and selected laboratory experiences. Aspects of cellular structure and function will be coupled with relevant aspects of developmental mechanisms. Lectures will include such topics as mitosis, gametogenesis, nuclear-cytoplasmic interactions, role of genes in cellular and developmental expressions, mechanisms of hormone action on cellular function in development, cell movements and affinities, and selected morphogenesis of germ layer derivatives. Prerequisites: BY 113, 114, 319, CH 101, 105 and 131 or CH 123, 126 and 331 (may be taken concomitantly).

391 Cellular and Developmental Biology 3 hrs.
A continuation of BY 390.

392 Cellular and Developmental Biology Laboratory 2 hrs.
Should be taken after BY 390 and concurrently with BY 391.

431 Plant Physiology 4 hrs.
A general introductory study of the 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 per week. Prerequisite: BY 113, 371 or 372, CH 131 or 331.

432 Animal Physiology 4 hrs.
A fundamental study of physical and chemical processes occurring in animals and of conditions which influence them. One 3-hour lab per week. Prerequisite: BY 114, 317, or 354, CH 131 or 331.

475 General Entomology 4 hrs.
The study of classification, habits and economic importance of insects including their collection, preservation, and identification. One 3-hour lab per week. Prerequisite: BY 114.

480 Biological Techniques 4 hrs.
Museum techniques for collecting, preserving, mounting, illustrating and displaying plants and animals. Includes herbarium mounts, skeleton preparations, study skins, bioplastics, photomicrography and instrumentation. Two 3-hour labs per week. Prerequisite: organic chemistry, 8 hours of physics or approval of instructor.

513 Plant Ecology 4 hrs.
A detailed consideration of ecological principles and concepts, as well as biotic and abiotic factors, relative to the development of plant communities and ecosystems. One 3-hour lab per week. Prerequisite: BY 238, 312.
514 Animal Ecology 4 hrs.
The study of the distribution, population dynamics and behavior of animal populations in relation to environmental factors. One 3-hour lab per week. Prerequisite: BY 278, 312, and organic chemistry.

515 Environmental Physiology 4 hrs.
The study of the physiological and behavioral responses of normal, healthy organisms to natural changes or extremes of the physical environment. One 3-hour lab per week. Prerequisite: BY 312; CH 223 and 8 hours of physics or approval of instructor.

521 Pathogenic Microbiology 5 hrs.
A study of bacteria in relation to infectious diseases. Two 3-hour labs per week. Prerequisite: BY 221.

522 Environmental Microbiology 5 hrs.
The study of microorganisms of the environment, interactions between microbial groups and between micro- and macroorganisms. Four hours lecture and two 3-hour labs per week. Prerequisite: BY 221 and organic chemistry.

539 Plant Anatomy 4 hrs.
A study of the ontogeny, differentiation and maturation of the various tissues and organs of angiosperms. Each student solves investigative problems into the growth and development of an angiosperm, using histological techniques. Two 3-hour labs per week. Prerequisite: BY 372.

542 Cellular Metabolism and Physiology 4 hrs.
A detailed study of the interconversions and functions of biomolecules in cells, including the major metabolic pathways, bioenergetics, interrelations of various pathways and various mechanisms of metabolic regulation. One 3-hour lab per week. Prerequisite: BY/CH 461 and 462 or approval of instructor.

562 Cell Biology Seminar 2 hrs.
Discussion of current topics in cell biology with emphasis on student participation. Depending on the number of students, some terms may be devoted to research problems. Prerequisite: approval of instructor.

569 Animal Histology 5 hrs.
The microscopic study of the various tissues and organs of the mammalian body. Two 3-hour labs per week. Prerequisite: BY 114 and six additional hours of biology or approval of instructor.

578 Advanced Invertebrate Zoology 4 hrs.
Phylogenetic consideration of the invertebrates, including structural, functional, embryological and physiological relationships leading to an understanding of the progressive complexity of animals. Includes laboratory and field trips. Two 3-hour labs per week. Prerequisite: BY 278 or approval of instructor.

579 Parasitology 5 hrs.
A survey of the parasitic protozoa and helminths found in man, together with a comparison with certain forms found in other animals. Emphasis is placed on history, geographical distribution, morphology, habitat, life-cycles and methods of reproduction, transmission, pathogenesis and symptomatology, diagnosis, and prevention. Two 3-hour
labs per week. Prerequisite: BY 114 and six additional hours in biology or approval of instructor.

585 Limnology 5 hrs.
A study of fresh-water environments and organisms exemplified by lakes, ponds, and streams in North Alabama. Includes laboratory and field trips. Two 3-hour labs per week. Prerequisite: 8 hours of chemistry, 4 hrs. of physics, BY 221, 278, 371 or approval of instructor. Offered Summer Term.

590 Special Topics in Biology 1-4 hrs.
Prerequisite: approval of instructor.

592 Projects in Biology 2-4 hrs.
Individual investigations into biological problems under direct supervision of an instructor. Designed for advanced level biology students with a biology grade of 2.5 or above and may be taken at the Marine Environmental Sciences Consortium, Dauphin Island, Alabama. Prerequisite: approval of instructor.

596, 597, 598, 599 Seminar 1 hr. ea.
Discussions of biological literature, careers in biology, graduate schools, and specialty schools. Pertinent discussion about current biological topics. Seniors must take a minimum of two hours. No more than three hours of Seminar may be counted toward a major. One term may be taken at the Marine Environmental Sciences Consortium.

Marine Sciences (MS)

Courses are offered at The Marine Environmental Sciences Consortium Sea Lab at Dauphin Island, Alabama, and may be taken for credit toward a biology major at UAH.

Freshman – Sophomore level courses:

201 Ocean Science 4 hrs.
An introduction to the marine environment, this course is designed to give beginning college students a full perspective of the major features of the oceanic realm and the relation of oceans to man. Lecture, laboratory, and field work are included.

202 Marine Biology 4 hrs.
A general survey of the invertebrates, vertebrates, and marine plants as communities with emphasis on local examples of these principal groups. Students will have an opportunity to examine marshland, estuarine, beach, dune inlet and neritic habitats, and niches. Lectures, laboratory, and field work will be included. Prerequisites: general biology and consent of instructor.

203 Techniques of Scientific Diving 2 hrs.
Training in basic diving with soft gear and self-contained breathing apparatus. Students learn techniques in search and retrieval, specialized sampling and observation, underwater photography, communication, navigation, and task performance. The course is designed for all science majors interested in the marine environment. Prerequisites: diver certification, medical clearance, and consent of instructor.

204 Natural History of Commercial Invertebrates 3 hrs.
This course will provide the non-major with a basic understanding of behavior, physiology, development and ecology of commercially important invertebrates. Some prior biology is recommended. Labs and field trips as well as lecture material.
Advanced Undergraduate—Graduate Courses:

500 Environmental Science for High School Teachers  4 hrs.
Designed especially for teachers, but open to upper level undergraduate and graduate students preparing for a teaching career. Basic principles of ecology, techniques of laboratory and field studies, sources and control measures of pollution included.

501 Introduction to Oceanography  4 hrs.
An introduction to the physics, chemistry, biology, and geology of the oceans. This is primarily intended for students at the graduate level, preparing for graduate school, or those seriously intending to enter the marine sciences professionally. Prerequisites: college algebra, general physics, and general chemistry.

502 Marine Geology  4 hrs.
Included in this course will be sampling techniques, laboratory analysis of sediments, application of the research process to problems in identifying sedimentary environments, hydrography, sediments, and history of the world oceans. Marine geology is especially beneficial to biology students for an understanding of the sedimentary substrate on or in which a large percentage of marine organisms live. Lecture, laboratory, and field work are included. Prerequisites: physical geology and consent of instructor.

503 Marine Botany  4 hrs.
This course is a general survey of marine algae, vascular and non-vascular plants associated with the marine environment. Distribution identification, structure, ecology, and reproduction will be considered.

504 Marine Invertebrate Zoology  4 hrs.
A survey, based upon local examples of the principal groups of marine invertebrates with emphasis on reproduction, distribution, taxonomy, systematics, and ecology. Lecture, laboratory, and field work are included. Students will have ample opportunity to acquire a collection of local fauna. Prerequisites: general biology and consent of instructor.

505 Marine Vertebrate Zoology  4 hrs.
A study of marine fishes, reptiles, and mammals, with an in-depth, comprehensive treatment of their systematics, zoogeography, and ecology. Lectures will encompass subject matter on a non-regional basis. Field and laboratory work will stress the vertebrate fauna of the northern Gulf of Mexico. Most of the course will be devoted to fishes. Students will have an opportunity to assemble a collection of vertebrate species. Prerequisites: general biology and consent of instructor.

506 Marine Zoogeography  4 hrs.
A study of physical, chemical and biological factors influencing the distribution of marine organisms. Emphasis is placed on the importance of continents, open oceans and species competition on animal distribution. Special attention will be given to zoogeographical patterns in the Gulf of Mexico, Western North Atlantic and Caribbean regions. Prerequisites: 12 semester hours of biology.

507 Physiology of Marine Animals  4 hrs.
An introduction to environmental adaptations of marine animals. Emphasis is placed on biochemical, osmotic, respiratory and temperature responses. Both invertebrates and fish are considered. Prerequisites: general biology, general physiology, organic chemistry (biochemistry desirable).

508 Marine Plankton  4 hrs.
A study of physical, chemical and biological factors influencing the distribution of marine organisms. Emphasis will be placed on the Western North Atlantic Ocean.

509 Marine Ecology  4 hrs.
Bioenergetics, community structure, population dynamics, predation, competition, and speciation in marine ecosystems will be studied. Lecture and laboratory work will be included, although considerable time will be spent in field work. Students who have not
previously had marine courses may enroll; however, Marine Invertebrate Zoology or Marine Biology would be very helpful. This would be an excellent course for engineers and other non-biologists interested in the marine environment because individual species will be studied as they relate to ecological principles which they exemplify providing both a taxonomic and ecologic background. Prerequisites: general biology, general chemistry, general physics, and consent of instructor.

510 Marsh Ecology 4 hrs.
This field course is designed primarily for those students who wish to gain a basic understanding of the ecology of a salt marsh. Emphasis will be placed upon habitat analysis, natural history studies and the population dynamics of selected vertebrates. Each student will be assigned a specific field problem that will be terminated by a technical paper. All students will be expected to live at the Point aux Pins Field Station. The student should be physically suited for the rigors of field work and life at a field station. There are no accommodations for families at the Point aux Pins facility. Open to advanced undergraduates and graduate students. Prerequisites: advanced standing in biology and consent of instructor. Attendance of seminar at Sea Lab is required. Maximum enrollment: Six students (both sexes).

511 Benthic Community Structure 4 hrs.
This course will focus on patterns of benthic macro-invertebrate abundance and distribution along the Alabama coastline. Considerable field sampling, taxonomy and data analysis will be included in lectures and labs. Major taxa such as polychaetes and crustaceans will be emphasized. Prerequisites: Invertebrate zoology and consent of instructor.

512 Fisheries Science 4 hrs.
An in-depth study of the principles and methods of marine fishery biology and their application to conservation. Lecture and laboratory work are included. Prerequisites: general biology and consent of instructor.

513 Fisheries Economics 4 hrs.
The physical and biological environment of commercial marine organisms and its effect on their distribution and natural fluctuations in abundance. Man’s impact on populations through fishing and habitat alteration. Ecology and life history of major groups. Problems of managing the fishery resources through regulation, mariculture, and preservation of specialized habitats. Prerequisite: consent of instructor.

514 Scientific Data Management 2 hrs.
This course exposes advanced undergraduate students to key techniques and principles in evaluating and expressing experimental data. Includes mapping, profiling, contouring, applied statistics and graphical and tabular representation of results. Does not substitute for basic statistics courses. No prerequisites.

515 Seminar 1 hr.
A discussion of current research, scientific progress, and problems in the marine environment with equal 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.

516 Research on Special Topics 1-6 hrs.
Students may enroll by special arrangement in any of the subjects listed. Prerequisite: consent of instructor.

Students should note which term they wish to take special topics in a particular subject. Only Marine Science Program resident faculty will be available for special topics both terms. Other instructors will be available only in the time period listed for their respective courses.
Graduate Courses

601 Oceanology of the Gulf of Mexico 4 hrs.
This course provides a detailed study of the Oceanology of the Gulf of Mexico and adjacent waters. The areas of study will include the coastal zone, continental shelf and deep ocean.

Chemistry

Professors: Arendale, McManus; Associate Professors: Dodson, Emerson, Harris, Riley (chairman); Assistant Professor: Coble; Assistant Research Professor: Gregory; Adjunct Associate Professor: Stephens

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 available for high quality undergraduate instruction.

Requirements for a chemistry major:
1. Satisfactory completion of the University’s 55-61 hours General Education Requirements which includes MA 153, 154, 233, PH 201, 241, 331, or PH 101, 102, 201, and CH 121, 123, 125, and 126;
2. Completion of one of the approved six AOC curricula below (or a different one, appropriately approved) each of which includes the 18 semester hours of CH 223, 331, 332, 333, 335, 336, 341, 342, and 345;
3. And completion of a number of electives which will vary depending on the particular curriculum chosen. German or Russian is recommended for the language requirement.

The 26-28 hours of science and mathematics included in Requirement 1 are not included in the AOC, while the 18 hours of chemistry included in Requirement 2 are included in the AOC.

Credit hours and letter grades may be obtained for Chemistry 121, 123, 125, and 126 by obtaining a satisfactory score on the CLEP examination. This examination will be offered at various times during the year through the Office of Counseling and Testing. It is recommended that students pursuing credit by examination consult with the Chemistry Department before taking the examination.

The Chemistry Department offers courses leading to a B. S. degree with a chemistry major and supports the 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 less than MA 153. Any student requiring these courses must understand that the total semester hours of course work taken as an undergraduate
may exceed the 128 semester hour guideline for a baccalaureate program.

Unless attention is given to the sequence in which courses are scheduled, chemistry majors may experience difficulty in getting the required courses within a four year period. Students should plan to take CH 223, 333, and PH 201 prior to the fall term of their junior year.

Six approved curricula, which 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 which differ from those listed require faculty approval. The six approved programs include those courses listed above as requirements for a chemistry major and are:

<table>
<thead>
<tr>
<th>Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Requirements (humanities and social sciences)</td>
<td>30-36</td>
</tr>
<tr>
<td>General Education Requirements (science and mathematics)</td>
<td>26-28</td>
</tr>
<tr>
<td>Chemistry (Requirement 2 above)</td>
<td>18</td>
</tr>
</tbody>
</table>

**Curriculum I**

Premedical Program.
The premedical program conforms to the requirements of most medical schools and contains sufficient chemistry to meet the requirements of a chemistry major. Prospective medical students are encouraged to explore their areas of interest outside of the sciences and to strive for maximum scholastic achievement. Students should consult with faculty members early in their college program and should be prepared to take the Medical College Aptitude Test during the spring of their junior year.

(An alternative premedical curriculum is included in the Biology section.)

<table>
<thead>
<tr>
<th>Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry, one or two electives (CH 337, 343, 346, 401, 461, 491)</td>
<td>3</td>
</tr>
<tr>
<td>Biology—BY 113-114 and one elective</td>
<td>12</td>
</tr>
<tr>
<td>Science electives</td>
<td>12</td>
</tr>
<tr>
<td>Humanities and social sciences electives</td>
<td>19-21</td>
</tr>
</tbody>
</table>

**Curriculum II**

For Class B Secondary Professional Teaching Certificate.
This program meets state certification standards in chemistry and in biology, mathematics, or physics as the student may elect. Only economics, political science, and sociology satisfy the 6 hours social sciences requirement in this curriculum.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry—CH 401</td>
<td>3</td>
</tr>
<tr>
<td>Biology—BY 113-114</td>
<td>8</td>
</tr>
<tr>
<td>Secondary Education</td>
<td>27</td>
</tr>
<tr>
<td>core</td>
<td></td>
</tr>
<tr>
<td>Physics or</td>
<td>8-9</td>
</tr>
<tr>
<td>Biology or</td>
<td>12</td>
</tr>
<tr>
<td>Mathematics</td>
<td>9</td>
</tr>
<tr>
<td>Electives</td>
<td>0-2</td>
</tr>
</tbody>
</table>

Curriculum III

Graduate Preparatory Program. ACS Approved Program.

This curriculum is approved by the American Chemical Society’s Committee on Professional Training. It is intended for a student who plans to do graduate work or who desires an industrial position which requires a strong chemical background. German is the recommended language for this program.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry—CH 337, 343, 346, 401, 521, electives, and a senior project</td>
<td>19</td>
</tr>
<tr>
<td>Mathematics—MA 244, 251, 352</td>
<td>9</td>
</tr>
<tr>
<td>Mathematics or physics elective</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>15-17</td>
</tr>
</tbody>
</table>

Curriculum IV

General Education Curriculum with a Chemistry Major

Deficiencies may exist with respect to graduate school entrance requirements.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry—CH 337, 343, 346, 401, one elective and a senior project</td>
<td>12</td>
</tr>
<tr>
<td>Mathematics—MA 244</td>
<td>3</td>
</tr>
<tr>
<td>Science electives</td>
<td>8-10</td>
</tr>
<tr>
<td>Electives</td>
<td>23-25</td>
</tr>
</tbody>
</table>
Curriculum V

Chemistry-Physics Program Appropriate for Pregraduate Education.

<table>
<thead>
<tr>
<th>Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry—CH 337, 343, 346, 401, 521, and a senior project</td>
<td>14-15</td>
</tr>
<tr>
<td>Physics (a)</td>
<td>PH 241, 331, 351, one laboratory from 310-312, and one elective, or 13</td>
</tr>
<tr>
<td>(b)</td>
<td>PH 351, 401, one laboratory from 310 and one elective 10</td>
</tr>
</tbody>
</table>

Sequence (a) requires prior completion of PH 101, 102, 201, while sequence (b) requires PH 201, 241, 331.

Mathematics—MA 244, 251, 352, and one elective 12

Electives 6-12

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</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry—CH 337, 343, 346, 461, 521, and a senior project</td>
<td>14-15</td>
</tr>
<tr>
<td>Biology—BY 113, 114, 221, and two electives</td>
<td>21</td>
</tr>
<tr>
<td>Mathematics—MA 244</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>7-10</td>
</tr>
</tbody>
</table>

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 section on Graduate Programs.)
It is emphasized that graduate courses are conducted at a level which assumes the student possesses 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, the time required to obtain the M.S. degree is correspondingly increased. (See section on Graduate Programs.)

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 advisor. When a student following Plan 1 selects his thesis topic, a supervisory committee will be appointed.

Specific requirements:

Plan 1
1. 24 semester hours of graduate course work, a thesis, and two units of seminar.
2. Reading competence in German or Russian. The 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 the completion of thirty-three or more semester hours of coursework. Of the thirty-three hours, at least twenty-one hours of coursework must be in chemistry and up to twelve hours may be in other graduate coursework. At least one-half the coursework in chemistry and one-half the other coursework must be 600-700 level. If the program contains three or more terms of full-time work, the degree requirements may be met with thirty or more semester hours of course work, eighteen 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 advisor.

All other general and grade requirements are identical with those discussed in the section School of Graduate Studies and Research.

Chemistry (CH)

101 General Chemistry 3 hrs.
An introduction is presented to the properties of solids, liquids, gases, and solutions, to atomic theory and bonding, and to the physical and chemical properties of the more common elements and their compounds. No credit given for AOC involving chemistry. Prerequisite: MA 104 or 105 or mathematics placement at Level II. Parallel: CH 105.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>105</td>
<td>General Chemistry Laboratory</td>
<td>1 hr.</td>
<td>Laboratory work is designed to introduce the student to laboratory fundamentals and to 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 exempted from CH 105 by permission of the Chemistry Department Chairman. Parallel: CH 101.</td>
</tr>
<tr>
<td>121</td>
<td>Introduction to Chemistry</td>
<td>3 hrs.</td>
<td>Beginning course for science and engineering majors. An introduction is presented to those principles concerned with gases, liquids, solids, and solutions. Discussions include the nature of the chemical bond, kinetics, chemical equilibrium, electrochemistry, thermochemistry, the chemical properties of the elements, their periodic groups and their compounds, and an introduction to nuclear chemistry. Prerequisite: CH 101 or placement test and MA 104 or MA 105 or placement at Level II in Mathematics. Parallel: CH 125.</td>
</tr>
<tr>
<td>123</td>
<td>Introduction to Chemistry</td>
<td>3 hrs.</td>
<td>A continuation of CH 121 with in-depth study of the topics listed. Prerequisite: CH 121. Parallel: CH 126.</td>
</tr>
<tr>
<td>125</td>
<td>Introductory Chemistry Laboratory</td>
<td>1 hr.</td>
<td>Laboratory work which complements the lecture material for CH 121. Parallel: CH 121.</td>
</tr>
<tr>
<td>126</td>
<td>Qualitative Inorganic Analysis Laboratory</td>
<td>1 hr.</td>
<td>Application of chemical equilibrium to the systematic separation and qualitative detection of the elements. Familiarizes students with the chemical and physical properties of numerous metal and complexions and compounds.</td>
</tr>
<tr>
<td>131</td>
<td>Introduction to Organic Chemistry</td>
<td>4 hrs.</td>
<td>An extension of CH 101 for those students desiring an understanding of the broad concepts of organic chemistry. Not open to chemistry majors. Includes laboratory. Prerequisite: CH 101, 105.</td>
</tr>
<tr>
<td>223</td>
<td>Quantitative Analysis</td>
<td>4 hrs.</td>
<td>Provides a background in fundamental quantitative analytical chemistry with an introduction to instrumentation. Data treatment, ionic equilibria, elementary electrochemical, spectrochemical, gravimetric, and volumetric techniques are discussed. Includes laboratories. Prerequisite: CH 126.</td>
</tr>
<tr>
<td>301</td>
<td>Elementary Biochemistry</td>
<td>3 hrs.</td>
<td>A general survey course in biological chemistry for students in a variety of disciplines. Topics of major emphasis will be enzyme function and major metabolic processes, their interrelations, and control such as photosynthesis, respiration, nucleic acids and protein synthesis, lipid metabolism and membranes. Topics of general interest in molecular physiology such as metabolic diseases and blood proteins will also be included. Prerequisites: BY 114 and CH 131 or 123. (Not recommended for chemistry majors and credit in CH 361 precludes credit in CH 301.)</td>
</tr>
<tr>
<td>331</td>
<td>Elementary Organic Chemistry</td>
<td>2 hrs.</td>
<td>The chemistry of organic compounds is systematically studied. Discussion includes synthetic methods, theory and reaction mechanisms. Prerequisite: CH 123, 126; CH 223 recommended.</td>
</tr>
<tr>
<td>332</td>
<td>Elementary Organic Chemistry</td>
<td>2 hrs.</td>
<td>Continuation of CH 331. Prerequisite: CH 331.</td>
</tr>
<tr>
<td>333</td>
<td>Elementary Organic Chemistry</td>
<td>2 hrs.</td>
<td>Continuation of CH 332. Prerequisite: CH 332.</td>
</tr>
</tbody>
</table>
335 Elementary Organic Chemistry Laboratory I
   Introduces techniques of organic chemistry including synthesis, separation, and
   identification of organic compounds with the use of chemical and spectroscopic
   methods. Prerequisite or Parallel: CH 331.

336 Elementary Organic Chemistry Laboratory II
   Continuation of CH 335. Prerequisite: CH 335. Prerequisite or Parallel: CH 332.

337 Organic Chemistry Laboratory
   A more advanced organic chemistry laboratory treating reactions and techniques not
   covered in CH 335 and 336. Each student is expected to pursue a special open-ended
   problem. Prerequisite: CH 336 and approval of instructor.

341 Chemical Thermodynamics
   Introduces the theory of classical thermodynamics and applies it to the chemistry of
   solids, liquids, gases, and solutions. Prerequisite: CH 223, PH 201. Prerequisite or
   Parallel: MA 233.

342 Chemical Dynamics
   Discussion includes kinetic theory of gases, theory and formulation of rate equations,
   mechanisms of chemical reactions, and applications. Prerequisite: CH 341.

343 Introduction to Quantum Chemistry
   An introduction to the quantum mechanical treatment of the chemical bond including
   discussions on structure, symmetry, spectroscopy, and statistical thermodynamics.
   Prerequisite: CH 342, MA 244.

345 Experimental Physical Chemistry I
   Laboratory investigations into the general area of thermodynamics. Prerequisite: CH
   341.

346 Experimental Physical Chemistry II
   Laboratory investigations into the general area of kinetics and spectroscopy. Prerequi-

361 General Biochemistry (same as BY 361)
   A detailed study of the molecules that comprise living systems, including their
   nomenclature, structure, properties, and functions in metabolism. Topics of major
   emphasis will be: enzymatic properties and function; major and minor biosynthetic and
   catabolic pathways, their interrelations and control mechanisms; glycolysis and
   gluconeogenesis; Kreb's cycle; photosynthesis, lipids; amino acids and proteins; and
   nucleic acids. Prerequisites: BY 114, CH 332 and CH 335.

362 General Biochemistry Laboratory
   Practical experience in the isolation, qualitative identification, and quantitative
   estimation of biomolecules. One 3-hr. lab per week. Prerequisite or parallel: CH 361.

401 Inorganic Chemistry
   A survey of certain fundamental topics in inorganic chemistry, including atomic
   structure, chemical bonding, periodic relationships, acid-base theories, non-aqueous
   solvents, and reaction mechanisms. Prerequisite or Parallel: CH 342.

491, 492, 493. Introduction to Chemical Research
   A personalized program designed to round out the undergraduate curriculum of students
   with various goals. Prerequisite or parallel: CH 345 and senior standing. Requires
   approval of the supervising faculty member and the Chemistry Chairman. Registration
   utilizes last digit of course number to designate semester hour credit. Student normally
   may elect only up to six hours.
506 Radioisotope Techniques
Lecture and laboratory course. Radioactivity decay, measurement and production. Applications of radioisotopes to chemical and biological phenomena. Prerequisite: CH 223 and MA 154.

521 Chemical Instrumentation
4 hrs.
An introduction to the use of basic instrumentation in electrochemical, chromatographic and spectrophotometric analysis. Laboratory work emphasizes the general utility of operational amplifiers in making chemical measurements and provides an introduction to digital logic. Prerequisite: CH 346.

525 Environmental Chemistry
3 hrs.
Principles of quantitative analyses related to the minor components of a sample. Applications will be selected from the principal analyses necessary to maintaining environmental quality of air, water, and soil. Emphasis will be placed on selection of conditions for collecting reliable samples; concentration of components with techniques for increasing concentration of selected component; relationships between physical and chemical changes in the sample and the signal output of the predominant transducers; and the translation of the chemical analysis into meaningful specifications. Lecture only. Prerequisite: CH 521; or CH 122 or 123; EG 311, 342.

531 Physical Organic Chemistry
3 hrs.
An introduction to theoretical organic chemistry. Topics stressed include bonding, methods for determining reaction mechanisms, reactive intermediates, and stereochemistry. Prerequisite: CH 333, 343, or approval of instructor.

540 High Polymer Chemistry
3 hrs.
The theory of polymer formation and the structural dependence of polymer properties are discussed. Prerequisite: CH 337, 342.

549 Spectroscopy and Molecular Structure
3 hrs.
An intermediate level treatment of the principles of spectroscopy and their application to the determination of molecular structure. Prerequisite: CH 343.

553 Introductory Quantum Mechanics I
3 hrs.
Same as PH 551. Prerequisite: CH 343, PH 351; MA 224, 251, 352.

554 Introductory Quantum Mechanics II
3 hrs.
Same as PH 552. Prerequisite: CH 553.

561 Molecular Biochemistry
3 hrs.
Structural chemistry and function of biomolecules, mechanisms of biochemical reactions, enzyme kinetics, energy transfer, metabolism and biological control mechanisms. Prerequisites: CH 333, 342 and BY 114.

600 Advanced Inorganic Chemistry
3 hrs.
A survey course with emphasis on the structure and reactivity of inorganic compounds. Prerequisite: CH 401.

601 Structural Methods in Inorganic Chemistry
3 hrs.
The study of various physical methods applied to the determination of the structure of inorganic compounds. Prerequisite: CH 600.

602 Chemistry of Coordination Compounds
3 hrs.
Modern bonding theory and stereochemistry of coordination compounds will be presented. Prerequisite: CH 601.

603 Chemistry of Non-Metal Compounds
3 hrs.
A study of the chemistry of selected non-metal compounds. Prerequisite: CH 601.
621 Methods of Chemical Analysis 3 hrs.
A literature, seminar course which emphasizes the theory and methodology of various
techniques of chemical analysis. Prerequisite: CH 521.

631 Advanced Organic Chemistry I 3 hrs.
A systematic study of the reaction mechanisms of various types of organic compounds.
Prerequisite: CH 531.

632 Advanced Organic Chemistry II 3 hrs.
A course which is complementary to previous courses and treats special classes of
compounds and natural products.

633 Synthetic Organic Chemistry 3 hrs.
A study of the reactions and principles involved in the synthesis of simple and complex
organic compounds. Prerequisite: CH 632.

640 Advanced Chemical Thermodynamics 3 hrs.
Presents a thorough treatment of the first, second, and third laws of thermodynamics and
applications. Includes a brief introduction to statistical thermodynamics. Prerequisite:
CH 343, MA 251, or approval of instructor.

641 Statistical Thermodynamics 3 hrs.
A discussion of principles leading to the development of Maxwell-Boltzmann,
Bose-Einstein, and Fermi-Dirac statistics is presented and thermodynamic properties are
calculated from the partition function. Prerequisite: CH 640.

642 Advanced Chemical Dynamics 3 hrs.
Concepts related to the velocity of chemical reactions in homogeneous and hetero-
genous systems are discussed. Included are the absolute rate theory, collision theory,
scattering, and the concept of reaction cross sections. Prerequisite: CH 640.

643 Quantum Chemistry 3 hrs.
An application of theory to the chemical bond in the spirit of Coulson and Murrell,
Kettle, and Tedder. Prerequisite: CH 640.

705 Selected Topics in Inorganic Chemistry 3 hrs.
Prerequisite: CH 603.

735 Selected Topics in Organic Chemistry 3 hrs.
Prerequisite. CH 633.

745 Selected Topics in Physical Chemistry 3 hrs.
Prerequisite: CH 643.

680 Chemistry Seminar 1 hr.
A minimum of two terms required of all students working toward the M.S. degree.

699 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 M.S. students. A maximum of 9 hours of credit is
awarded upon successful completion of the master's thesis.

799 Doctoral Dissertation 3, 6 or 9 hrs.

Computer Science

Courses in computer science are offered to satisfy the requirements of an AOC
cluster or an engineering option in the undergraduate program and to satisfy
approved specializations in the graduate program.
The following list is typical of clusters chosen by students.

Undergraduate—CS 113, 208, 214, 308 and one of the following options:

(a) CS 311, 411, 513, 514, 517 or 512
(b) CS 309, 415, 513, 517 or 512

Graduate—CS 511 and one of the following options:

(a) CS 513, 514 or 690
(b) CS 512, 513, 517, 690 or 514
(c) CS 603, 703

Computer Science (CS)

113 Introduction to Computing
3 hrs.
Introduction to the concept of an algorithm; basic components of algorithms such as assignment, conditional branching, and input/output; basic algorithmic processes such as sorting, searching, table look-up and iterative procedures; representation of algorithms in the form of flow charts and computer programs; components and basic capabilities of computer systems; the programming language ANSI FORTRAN and computer experience in the use of this language in the solution of both numerical and non-numerical problems; definition and use of functions and subroutines. Includes laboratory. No credit to student who has completed EG 196. Prerequisite: MA 105 or Level II placement in mathematics.

208 Computer Organization and Software Systems I
3 hrs.
Computer hardware organization; representation 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, third generation programming concepts including subroutines, recursive code and reentrant code, and macros; study of the organization of the University's computer and its assembly language: programming experience in an assembly language. Includes laboratory. Prerequisite: CS 113 or EG 196.

214 Introduction to Discrete Structures
3 hrs.
Review of set algebra including mappings and relations; algebraic structures including semigroups and groups; elements of the theory of directed and undirected graphs; Boolean algebra and propositional logic; applications of these structures to various areas of computer science. Prerequisite: CS 113.

308 Computer Organization and Software Systems II
3 hrs.
Interpreters and simulations of computers; data flow in the central processing unit; microprogramming and simulation of a microprogrammable computer; functional description of input/output and mass storage devices; software for controlling and utilizing such devices; structure and operation of assemblers; study of the architecture of the University's computer and its operating system. Prerequisite: CS 208.

309 Switching Theory
3 hrs.
Techniques for the analysis and design of combinational and sequential switching networks; Boolean algebra, elements of code theory; minimum complexity combinational networks; threshold logic; functional decomposition; minimum complexity sequential networks; asynchronous sequential networks. Prerequisite: junior standing or CS 308. Same as EG 309.
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 communications, file design, report control, documentation; data bases, information collection, planning and control, systems design concepts. Includes ANSI COBOL. Prerequisite: CS 308. Same as EC 311.

411 Computer Applications in Economics and Business II 3 hrs.
Techniques in economic business modeling; case studies of business applications; computer simulation of business operations. Projects requiring independent research. Prerequisite: CS 311. Same as EC 411.

415 Introduction to Digital Computer Design 3 hrs.
Logic and electronic design of functional digit 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; design of a digital computer. Prerequisite: CS 309. Same as EG 415.

511 Machine and Assembly Language Programming 3 hrs.
Machine and assembly language programming in fixed wordlength computers; techniques in addressing and machine control; data structures and data processing; use of subroutine linkages; co-routines, pushdown lists, list processing, loops and input-output subroutines; use of a macro-assembly language; sorting, merging, arrays, and data fields in data processing. Not open to students who have taken CS 308. Prerequisite: CS 113 or EG 196. Same as EG 511.

512 Compiler Construction 3 hrs.
Review of program language structures, translation, loading, execution, and storage allocation. Compilation of simple expressions and statements. Organization of a compiler including compile-time and run-time symbol tables, lexical scan, syntax scan, object code generation, error diagnostics. Use of compiler writing languages. Prerequisite: CS 517. Same as EG 512.

513 Digital Computer Systems 3 hrs.
Examination of the architecture of selected third generation computers; organization of various computer processors; study of computers with single and multiprocessor environments; parallel processing; computer families. Prerequisite: CS 308 or CS 511. Same as EG 513.

514 Analog Computation and Problems in Economics 3 hrs.
Introduction to computing elements, magnitude and time scaling, analog computer solution of problems in economics represented by linear, nonlinear differential and matrix equations; concepts of modeling and simulation. Two credit hours for lecture and one credit hour for laboratory. Prerequisite: EC 430 or EC 510 or approval of instructor. Same as EC 514.

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. Prerequisite: CS 308 or CS 511 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, context-free and context-sensitive grammars. Definition of mathematical machines finite-state, pushdown, linear bounded automata. Relationship between formal languages and automata. Prerequisite: CS 214 or approval of instructor.
Operating Systems 3 hrs.
Techniques of constructing operating system control programs including management of system, jobs, and data; multiprogramming, multiprocessing, and time-sharing systems. Prerequisites: CS 511 or 513. Same as EG 690.

Theory of Programming Languages 3 hrs.
Syntactic analysis and semantic interpretation of formal languages and the associated compiler techniques as utilized in current procedure oriented compilers. Prerequisite: CS 603. Same as EG 703.

Environmental Sciences

Adjunct Professors: Doyle, Essenwanger; Associate Professor: Adams; Adjunct Associate Professor: Johnson; Assistant Professor: Rosing

Environmental science courses are offered as science electives and/or requirements for an environmental science certificate program designed to prepare undergraduate students in science, mathematics, and engineering for solving problems relating to man's interaction with the natural environment.

The requirements for obtaining the certificate include completion of a group of basic science courses (I), an environmental science core (II), and any two advanced courses (III).

I. Basic Sciences (all required unless exempted by advanced placement and/or testing in each case)

<table>
<thead>
<tr>
<th>Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Biology 113, 114</td>
<td>8</td>
</tr>
<tr>
<td>2. Chemistry 121, 122, 125, 126</td>
<td>7</td>
</tr>
<tr>
<td>3. Physics 101, 102</td>
<td>8</td>
</tr>
<tr>
<td>4. Environmental Science 101, 102</td>
<td>8</td>
</tr>
<tr>
<td>5. Two basic courses in Statistics and/or Computer Science (CS)</td>
<td>6</td>
</tr>
</tbody>
</table>

II. Environmental Core (all required)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. BY 312 - Principles of Ecology</td>
<td>4</td>
</tr>
<tr>
<td>2. ES 303 - Environmental Climatology</td>
<td>3</td>
</tr>
<tr>
<td>3. ES 311 - Environmental Geology and Hydrology</td>
<td>3</td>
</tr>
<tr>
<td>4. ES 321 - Pollution Problems</td>
<td>3</td>
</tr>
</tbody>
</table>
III. Advanced Level Specialization (only six hours required, selection depending on major, interest, prerequisite, etc.)

1. BY 522 – Environmental Microbiology 5
2. BY 585 – Limnology 5
3. BY 501 – Marine Ecology 4
4. CH 525 – Environmental Chemistry 3
5. EG 542 – Environmental Engineering 3
6. EG 524 – Human Factors 3
7. EG 427 – Management Science 3
8. EG 422 – Systems Analysis 2
9. EG 559 – Selected Topics in Mechanical Engineering 3
10. ES 304 – Environmental Meteorology 3
11. ES 521 – Environmental Data Analysis 3
12. BY 515 – Environmental Physiology 4

Environmental Science (ES)

101 Planetary and Atmospheric Science 4 hrs.
Spatial relationships of the earth, moon, and sun that determine the figure of the earth, earth motions, time, seasons, atmospheric and oceanic circulation, weather, and climates. Includes practical and field work.

102 Physical Geology 4 hrs.
Nature and evolution of the earth’s continents and ocean basins; includes 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. Includes laboratory and field work.

303 Environmental Climatology 3 hrs.
Classification definition of types of climate; processes of atmospheric dispersions – turbulent transfer and diffusion; environmental alterations by man; climate/ecology relationships. Prerequisites: MA 233 or approval of instructor.

304 Environmental Meteorology 3 hrs.
Physical properties and dynamics of the atmosphere; factors that govern weather conditions; meteorological factors affecting the design and operation of aircraft; weather research. Prerequisite: approval of instructor.

311 Environmental Geology and Hydrology 3 hrs.
Study and evaluation of the geologic and hydrologic constraints on land use. Includes considerations of influence of topography; energy, mineral, soil, and water resources; and, geologic and hydrologic hazards. Fundamentals of hydrology. Prerequisite: permission of the instructor.

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. Prerequisite: sophomore standing and approval of instructor.
Mathematics and Statistics

Professors: Gibson, Associate Professors: Cook, Doss, Forte, Hoomani, Roach; Assistant Professors: Casazza, (chairman), Chang, Pengra; Instructors: Beasley, Cothran, Turner

Undergraduate Programs

The mathematics faculty offers courses in mathematics (MA) and statistics (ST) to satisfy requirements for a B.S. or B.A. degree in mathematics, a B.S. or B.A. degree in mathematics education, or a cluster in mathematics for students majoring in other areas. Courses are also provided to satisfy individual needs for courses to supplement other areas of study and to satisfy General Education Requirements.

All areas of concentration (AOC) with a major in mathematics must include: MA 153, 154, 233, 244, 251, 442, and 501 (basic core – 21 semester hours). Other MA courses and electives in MA courses are required, depending on the curriculum that the student is pursuing. Details concerning these courses and electives are given in Curricula I and II. All MA electives must be preapproved by the student’s faculty advisor.

All AOC's with a major in mathematics education (Curriculum III) must satisfy the requirements of the Professional Elementary Education Curriculum (see Department of Education Section) and must include: MA 153, 154, 243, 244, 333, 350, 385, 442 and one approved MA course numbered above 200.

Students majoring in other academic areas may include only MA courses numbered above 140 in their AOC. A typical mathematics cluster consists of MA 153, 154, 233, 244, 251 and two approved MA courses numbered above 300. All MA clusters must include MA 153 and 154.

No student may enroll in his first MA course at UAH prior to determination of his placement level. Students who have no prior 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 General Education Requirements should make their choice from the sequence MA 104, 143, 243, 333, 350, 385, beginning with the course indicated by their placement level.
Students who may continue in mathematics and need 3 to 9 hours to satisfy General Education Requirements should make their choice from the sequence MA 105, 133, 153, 154, 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; Level II—MA 133 or 143; Level III—MA 153 or 243.

The following curricula are given as examples of approved curricula. Students who feel that substitutions can produce a program better suited for their needs are encouraged to consult their faculty advisor about the feasibility of such substitutions.

**Curriculum I**

B.A., or B.S. Degree with a Major in Mathematics.

<table>
<thead>
<tr>
<th>Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Requirements:</td>
<td></td>
</tr>
<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 Sciences</td>
<td>6</td>
</tr>
<tr>
<td>Mathematics (courses numbered below 150)</td>
<td>0-6</td>
</tr>
<tr>
<td>Laboratory Science</td>
<td>0-16</td>
</tr>
</tbody>
</table>

For B.A., 8 hours in one science or a science cluster

For B.S., one of the following options:

(a) 8 hours in physics with a cluster in another science
(b) A physics cluster with 8 hours in another science
(c) 8 hours in physics and 8 hours in another science

**Mathematics Major (minimum requirements):**

MA Basic Core and MA 352 | 24
MA Electives (must be preapproved by student's mathematics advisor; must be at 300-level or above; must include at least two 500-level courses) | 12

**Note:** MA 554 and 570 are recommended choices for students preparing for graduate study in mathematics.

Cluster (see examples below) | 21-24
Electives (to bring total number of semester hours to 128) | 10-41
B.A. or B.S. Degree with Major in Mathematics; Meets Requirements for a Class B Secondary Professional Teaching Certificate.

### General Education Requirements:

<table>
<thead>
<tr>
<th>Category</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>English, History, Speech and Psychology</td>
<td>24</td>
</tr>
<tr>
<td>Language (French, German, or Russian recommended)</td>
<td>6-12</td>
</tr>
<tr>
<td>Social Sciences (Economics, Political Science, or Sociology)</td>
<td>6</td>
</tr>
<tr>
<td>Mathematics (courses numbered below 150)</td>
<td>0-6</td>
</tr>
<tr>
<td>Science</td>
<td>4-16</td>
</tr>
</tbody>
</table>

For B.A., one of the following options:

(a) 4 hrs. in Biology with a Physical Science cluster
(b) 4 hrs. in a Physical Science with a Biology cluster
(c) 4 hrs. in Biology and 8 hrs. in a Physical Science
(d) 4 hrs. in a Physical Science and 8 hrs. in Biology

For B.S., one of the following options:

(a) 8 hours in Physics with a cluster in another science
(b) A Physics cluster with 8 hours in another science
(c) 8 hours in Physics and 8 hours in another science

### Professional Education Courses:

ED 261, 263, 388, 490, 497
Mathematics Major (minimum requirements):
MA Basic Core, MA 333, and MA 385 or 585
MA Electives (must have prior approval of student’s mathematic advisor; must be at 300-level or above and must include at least one 500-level course)

Cluster (see examples below)

### Electives (to bring total number of semester hours to 128)
0-9

Note:
Unless carefully planned, this curriculum may require more than the minimal total of 128 semester hours. Students pursuing this curriculum should consult their adviser early in their program.
Curriculum III

B.A. or B.S. Degree with a Major in Mathematics Education; Meets Requirements for the Professional Elementary Education Curriculum.

Semester Hours

General Education Requirements:
As in Curriculum II 48-64
Additional Humanities (ART 215, MU 215, ED 215) 9
Additional Social Sciences (see PEEC Requirements) 6

Mathematics (minimum requirements):
MA 153, 154, 243, 244, 333, 350, 385, 442, and one MA elective numbered above 200 27

Pre-Professional Courses (ED 230, 261, 263, 265, 266) 11

Professional Education Courses:
ED 360, 367, 370 or 371, 372, 373, 491 16

Electives (to bring total number of semester hours to 128) 0-11

Note:
Unless carefully planned, this curriculum may require more than the minimal total of 128 semester hours. Students who elect this curriculum will not be adequately prepared for graduate study in mathematics. Details of the Professional Elementary Education Curriculum can be found in the Department of Education section.

The following approved clusters are typical of clusters chosen by students who major in mathematics. Students who feel that substitutions can produce a program better suited for their needs are encouraged to consult their faculty advisor about the feasibility of such substitutions. Clusters (h) and (i) require the prior approvals of the student's mathematics faculty advisor and representatives of all other involved departments.

(a) Biology—BY 113, 114, and 13 hours of BY courses with at least six of these hours in courses numbered 300 or above.
(b) Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 333, 335, 336, 341.
(c) Physics—PH 101-102, 201, 241, 321, 331, 351.
(d) Economics—EC 142, 143, 340, 341, 345, 448, and ST 287.
(e) Operations Research—CS 113, EG 220, 390, 421, 525, 527, and 522 or 526.
(f) Industrial Engineering—EG 220, 321, 390, 421, 524, 525, and 523 or 526.

(g) Computer Science—CS 113, 208, 214, 308, and one of the following options: CS 311, 411, 514, and 512 or 513 (interest in business or economics); CS 309, 415, 512 or 513 (interest in systems design and analysis).

(h) A cluster of 21 hours in one discipline, including at least 6 hours numbered above 300 which is approved by the department concerned and the student’s mathematics faculty advisor.

(i) A cluster of courses consisting of a minimum of 15 hours in one discipline and a minimum of 9 hours in another discipline, including 9 hours in courses numbered above 300, which is approved by the departments concerned and the student’s mathematics faculty advisor.

Note:
Students who expect to pursue graduate study in applied mathematics are urged to select a cluster 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 obtained through a cooperative program with the Tuscaloosa campus. (Interested students should contact the Chairman of the Department of Mathematics.)

In addition to fulfilling the Graduate School requirements, each student’s program (except in the options noted below) must include MA 642, 671, 653, 656 and one of the following:

(a) An approved thesis, and 12 hours of electives which must be selected so that the program includes an approved 6 hour sequence; or

(b) 21 hours of approved electives including any two of MA 644, 670, 743, 754, 756.

With prior approval of the student’s graduate advisor, a student may instead choose a program with emphasis in probability and mathematical statistics. The requirements for this option are (a), (b), and (c) below.

(a) MA 544, 585, 653, 656, 685, and ST 687;

(b) MA 754, 785; or ST 787 and 3 hours of approved electives;

(c) An approved thesis or 9 hours of approved electives.
With prior approval of the Department of Mathematics, a student may choose a
program leading toward the Class A Secondary Professional Certificate. This
option is primarily for secondary school teachers and is quite flexible so that it can
be individually designed to meet the student’s needs. The requirements include 24
hours of mathematics and nine hours of education, all at the graduate level.
Students interested in this option should contact the Chairman of the Department
of Mathematics as soon as possible since it requires careful planning of the program
to meet all requirements.

Normally, no more than 6 hours of non-MA courses are applicable to the M.A.
degree in mathematics. Students choosing the thesis option may include at most 9
hours from 500 level courses. Students who choose the non-thesis option may
include at most 12 hours from 500 level courses. In all cases, all 500 level courses
and all electives must receive prior approval of the student’s advisor.

In addition to fulfilling the Graduate School requirements, all applicants for
graduate study in mathematics should have completed the equivalent of MA 153,
154, 233, 244, 251, 442, 453 and 9 additional hours in upper division courses.
Students who are deficient in more than two undergraduate courses in mathematics
must remove these deficiencies prior to admission to the mathematics program.
Such students should consult with the Chairman of the Department of Mathematics
as to how to best remove these deficiencies.

Applicants for graduate study in mathematics must present a satisfactory
undergraduate scholastic record and satisfactory Graduate Record Examination
(GRE) scores in both the aptitude and mathematics portions of the examination.
Each applicant must:

(a) Have a minimum overall undergraduate quality point average of at least 2.0
    (A=3.0), or at least 2.0 for the last 60 hours of work, and

(b) Score at least 1,000 on the aptitude portion of the GRE.

An applicant whose scholastic record does not fully meet the requirements for
admission may be admitted provisionally (see section on School of Graduate
Studies and Research).

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 110.

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 prior to enrollment in MA courses numbered 100 or above.
5. No student may enroll in his first MA course at UAH prior to determination of his placement level.

004 High School Algebra
For students with a deficiency of high school credit in algebra.

033 High School Geometry
For students with a deficiency of high school credit in geometry. Prerequisite: MA 004 or one unit of high school algebra.

104 Introduction to Contemporary Mathematics
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; the system of whole numbers; numeration systems; fundamental algorithms; integers, rational numbers; real numbers; elementary number theory. Prerequisite: one unit of high school algebra and Level I placement.

105 College Algebra
No credit given to students who have received credit for another MA course or who are placed at Level II or above. Sets, set operations, the real number system, equations in one variable, polynomials, rational expressions, exponents and radicals, systems of linear equations, matrices, determinants, relations and functions, the exponential and logarithmic functions. Prerequisite: one unit of high school algebra and Level I placement.

133 Algebra and Trigonometry
No credit given to students who have successfully completed an MA course numbered above 140 or who are placed at Level III. Functions, relations, graphs, circular and trigonometric functions, applications of trigonometry, solution of right and oblique triangles, inverse trigonometric functions, trigonometric equations and identities, complex numbers, polynomial functions, zeros and factorization of polynomials, introduction to analytic geometry. Prerequisite: MA 105 or Level II placement.

143 Finite Mathematics
No credit given to students who have successfully completed MA 133 or a higher level MA course or who are placed at Level III. Elementary logic, sets, partitions and counting, elementary probability theory, and introduction to vectors, matrices, systems of equations, and linear programming. Prerequisite: MA 104 or 105 or Level II placement.

153 Calculus and Analytic Geometry
Introduction to plane analytic geometry, functions, limits, continuity, the derivative and applications of the derivative. Prerequisite: MA 133 or Level III placement.

154 Calculus and Analytic Geometry
The differential and antidifferentiation, the definite integral, applications of the definite integral, logarithmic and exponential functions, trigonometric functions. Prerequisite: MA 153.

233 Calculus and Analytic Geometry
Inverse trigonometric functions, hyperbolic functions, techniques of integration, polar coordinates, the conic sections, indeterminant forms, improper integrals, vectors in the plane, parametric equations, vectors in three-dimensional space. Prerequisite: MA 154.

243 Mathematical Structures
Sets and counting, mathematical induction, elementary number theory, introduction to groups, rings, and fields, cardinal numbers, and an introduction to affine and projective planes. Prerequisite: MA 133 or 143 or Level III placement.
Introduction to Linear Algebra 3 hrs.
No credit given to students who have successfully completed either MA 442 or MA 501. 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 transformations, change of basis, similar matrices, eigenvalues and eigenvectors, diagonalization, and symmetric matrices. Prerequisite: MA 233 or MA 243 and approval of instructor.

Calculus and Analytic Geometry 3 hrs.
Sequences, infinite series, power series, Taylor’s formula, solid analytic geometry, limits and continuity of functions of several variables, partial derivatives, directional derivatives, multiple integrals. Prerequisite MA 233.

Introduction to Geometry 3 hrs.
Axiomatic development of geometry. Introduction to non-Euclidean geometries with emphasis in elliptic and hyperbolic geometries. Selected topics in Euclidean geometry. Prerequisite: MA 243 or MA 244 or approval of instructor.

Logic and the Real Number System 3 hrs.
Symbolic logic, set theory, the axiomatic method, abstract algebra, number systems, the real number system and the limit concept. No credit given to students who have successfully completed either MA 442 or MA 501. Prerequisite: MA 243 or MA 244.

Introduction to Differential Equations 3 hrs.
First-order differential equations, linear differential equations, linear differential equations with variable and constant coefficients, variation of parameters, Laplace transforms, series solutions, selected applications. Prerequisite: MA 244 or EG 281, MA 251.

Introduction to Probability 3 hrs.
No credit given to students who have successfully completed MA 585. Finite probability spaces, conditional probability, random variables, expectation, random and limiting processes leading to distributions including binomial, Poisson, and normal. Prerequisite: MA 233 and at least one other MA course at the 200 level or above.

Elementary Numerical Methods 3 hrs.
Iterative methods for the solution of non-linear equations, error analysis, acceleration of convergence, interpolation and approximation of functions, numerical integration. Use of digital computer recommended. Prerequisite MA 244, 251, or approval of instructor.

Introduction to Abstract Algebra 3 hrs.
Introductory study of groups, rings, integral domains and fields. Elementary theory of numbers. Prerequisite: at least one MA course at 300 level or above.

Senior Seminar 1-3 hrs.
The purpose of this course is to enable the mathematics faculty to offer selected undergraduate topics in mathematics. Prerequisite: approval of instructor.

Introduction to Real Analysis I 3 hrs.
Elementary set theory, the real number system, convergence of sequences, open and closed sets, the Bolzano-Weierstrass and Heine-Borel theorems, limits, continuous functions, uniformly continuous functions, derivatives and their properties. Prerequisite: MA 350 or 352 or 442 or approval of instructor.

Numerical Analysis 3 hrs.
521 Introduction to Complex Analysis
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 501 or approval of instructor.

525 Intermediate Differential Equations
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.

526 Partial Differential Equations
Systems of first order ordinary differential equations, first order quasilinear partial differential equations, the general first order partial differential equation via Cauchy’s method of characteristics, higher order equations, canonical forms, separation of variables, Fourier series, transform methods, and selected topics. Prerequisite: MA 352.

527 Advanced Vector Calculus
A brief review of vector algebra and the calculus of vector-valued functions; representation of vector operators in curvilinear coordinates; line and surface integrals; the theorems of Gauss, Green, and Stokes; the Jacobian, and changes of variables in multiple integrals. Prerequisite: MA 352 or approval of instructor.

533 Differential Geometry
Theory of space curves, the concept of a surface, first and second fundamental forms, foundations of tensor calculus; Gaussian, mean and geodesic curvature. Prerequisite: MA 352.

544 Linear Algebra
Vector spaces, linear transformations, matrices, determinants, eigenvalues, similarity, linear functionals, bilinear forms, quadratic forms, orthogonal and unitary transformations. Prerequisite: MA 442 or 501.

551 Functions of Several Variables
Topology of \( \mathbb{R}^n \), limits and continuity of functions of several real variables, differentiation, applications of partial differentiation, Jacobians, the implicit function theorem and extremum problems. Prerequisite: MA 501.

554 Introduction to Real Analysis II
Riemann-Stieltjes integration, functions of bounded variation, infinite series, power series, convergence tests, sequences and series of functions. Prerequisite: MA 501.

570 Metric Spaces
Countable and uncountable sets, metric spaces, open and closed sets, sequences, subspaces, bounded sets and diameters, continuous functions, homeomorphisms, extensions of continuous functions, contraction mappings and fixed point theorems, completeness, separability, category, compactness, connectedness, and product spaces. Prerequisite: MA 501.

585 Probability
An introduction to probability theory and its applications. Independent trials, discrete and continuous random variables, the law of large numbers, basic distributions, sums of independent random variables, sequences of random variables, the central limit theorem and convergence in distribution. Prerequisite: MA 251.

590 Selected Topics in Mathematics
The purpose of this course is to enable the mathematics faculty to comply with requests for courses in selected topics. Prerequisite: approval of instructor.
621 Special Functions
The gamma and beta functions, the 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
Types of problems in the calculus of variations, a study of necessary and sufficient conditions for extrema of a definite integral in both parametric and nonparametric representations in the plane, the Bolza problem. Prerequisite: MA 501 or approval of instructor.

633 Geometry
Axioms of incidence and order, affine structure of the plane, metric properties, isometries, similarity transformations, the group of angles, orientation. Prerequisite: MA 442, 544 or approval of instructor.

642 Abstract Algebra
Isomorphism theorems for groups, rings and modules, group automorphism, direct products, first Sylow theorem, unique factorization domain and principal ideal domain, finite fields, field extensions, Kronecker's theorem, basic notions about modules. Prerequisite: MA 442 or approval of instructor.

644 Matrix Theory I
Matrix polynomials, characteristic and minimal polynomials, functions of matrices, invariant polynomials, elementary divisors, similarity of matrices, normal forms of a matrix, matrix equations, generalized inverses. Prerequisite: MA 544.

653 Real Analysis I
Archimedian ordered fields, the real number system, real line topology, characterization of open and closed sets of reals, modes of convergence, types of continuity, the Weierstrass-Approximation Theorem, Ascoli's theorem, Vitali's covering theorem, inferior and superior limits, Dini numbers and differentiability of monotone functions. Prerequisite: MA 554 or 570 or approval of instructor.

656 Complex Analysis I
Topology of the complex plane, holomorphic functions, power series, elementary functions, Cauchy's theorem, Liouville's theorem, the maximum modulus theorem, isolated singularities, residue theory, Rouche's theorem, and Vitali's theorem. Prerequisite: MA 501, 554 or approval of instructor.

670 Introduction to Functional Analysis
Normed and inner product spaces, finite dimensional spaces, product and quotient spaces, equivalent norms, the Hahn-Banach theorem, the principle of uniform boundedness, the open mapping theorem, the Riesz representation theorem, complete orthonormal sets, Bessel's inequality, Parseval's identity, and conjugate spaces. Prerequisite: MA 570.

671 General Topology
Topological spaces, bases, subbases, subspaces, 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, the product topology, product invariance of topological properties, and introduction to Moore-Smith convergence. Prerequisite: MA 570.

685 Stochastic Processes
Normal, Wiener, stationary and Poisson processes, counting and renewal processes, discrete and continuous Markov chains, and generalized recurrent events. Prerequisite: MA 585, 244 or approval of instructor.
690 Special Topics in Mathematics
The purpose of this course is to enable the mathematics faculty to comply with requests for courses in special topics. Prerequisite: approval of instructor.

699 Master's Thesis
Required each term a student is working and receiving direction on his master's thesis. A minimum of two terms is required for Plan I M.A. students. A maximum of 9 hours of credit is awarded upon successful completion of the master's thesis.

743 Group Theory
The isomorphism theorems, permutations groups, the basis theorem and the fundamental theorem for finite abelian groups, the Remak-Krull-Schmidt theorem, the Sylow theorems, normal series, solvable groups, extensions, selected topics in representation theory. Prerequisite: MA 642 or approval of instructor.

744 Matrix Theory II
Special types of complex matrices, nonnegative matrices, stochastic matrices, localization of eigenvalues, and selected advanced topics. Prerequisite: MA 644 or approval of instructor.

752 Theory of Differential Equations
Existence and uniqueness of solutions; initial value problems; theorems of Picard-Lindelof, Cauchy-Peano and Kamke; stability problems, two-point boundary value problems, orthogonal systems, perturbation theory, Poincare-Bendixon theory. Prerequisite: MA 525, 653 or approval of instructor.

754 Real Analysis II
Algebras, Borel sets, outer measure, measurable sets, Lebesgue measure, the sigma algebra of measurable sets, measurable functions, the theorems of Riesz, Egorov and Luzin, sequences of measurable functions, the Riemann integral, the Lebesgue integral of a bounded function over a set of finite measure, the general Lebesgue integral, the theorem of Fatou, convergence in measure, the indefinite Lebesgue integral. Prerequisite: MA 653.

756 Complex Analysis II
Mittag-Leffler theorem, Weierstrass product theorem, Runge's theorem, the Riemann Mapping theorem, analytic continuation, algebraic functions, and an introduction to elliptic functions and Riemann surfaces. Prerequisite: MA 656 or approval of instructor.

785 Advanced Theory of Probability
Probability measure, stochastic independence, modes of convergence, limit theorems, and introduction to Brownian motion. Prerequisite: MA 585, 554, or 570.

790 Graduate Seminar
The purpose of this course is to enable the mathematics faculty to teach selected topics to students in the Cooperative Ph.D. Program. Prerequisite: approval of instructor.

799 Doctoral Dissertation
Required each term a student is working and receiving direction on his Ph.D. thesis in the Cooperative Ph.D. Program. Prerequisite: approval of instructor.

Statistics (ST)

287 Applied Statistics I
Collection and presentation of data; averages, dispersion and skewness; binomial, normal, X², t- and F- distributions: estimation, confidence intervals and tests of significance. Includes laboratory. Prerequisite: MA 104 or MA 105 or Level II placement.
387 Applied Statistics II
3 hrs.
Linear and nonlinear regression, rank and Pearson correlations, an introduction to multiple regression and analysis of variance, nonparametric methods. Prerequisite: ST 287 or EC 231 or PY 231 or SOC 231.

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. Prerequisite: MA 244, 585.

787 Theory of Statistics II
3 hrs.
Continuation of hypothesis testing, likelihood ratio and unbiased tests, uniformly most powerful tests, and power function; non-parametric tests, statistical decision theory, Bayes and minimax decision rules, relation to testing and estimation, multivariate normal distribution and linear models. Prerequisite: ST 687.

Natural Science

The Natural Science sequence (12 semester hours) is an integrated science program designed specifically for liberal arts (non-science) majors. Contemporary aspects of science are used as 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 so as to minimize the distinction between the three disciplines. Study in this program is directed toward conveying the impact of science on the individual’s life and teaching students to apply general, but sound, scientific logic to arrive at reasonable conclusions about scientific and technological questions. Stressed throughout the three terms are: (1) the interaction of science with social, economic, and political forces; (2) the strengths and limitations of science and technology; and (3) an understanding of science as a human endeavor. The laboratory (necessary for any sound basic science program) is used to encourage students to become aware of modern-day problems and to illustrate the need for careful, experimental investigation of technical problems in the spirit of the scientific method.

The Natural Science sequence may be used to fulfill the University’s general education science requirements and it also satisfies the physical and biological science requirement for teacher certification. The maximum benefit will be obtained when the three terms are taken sequentially because of the integrated nature of the program. However, the courses may be taken out of sequence, any individual term may be taken as an elective, and combinations of the courses with other laboratory sciences are possible to fulfill the basic science requirements as outlined in the General Education Requirement of the catalog. The program is open to undergraduates at all levels.

Natural Science (NS)

111 Ecological Awareness. Includes laboratory and tutorial.
4 hrs.
A presentation of scientific nomenclature, ecosystems, cycles, environmental problems, population and control, resource depletion, food nutrition and additives, social and political issues, and economics as related to the ecological crisis. Prerequisite: Level I placement in mathematics (1 year of high school algebra).
Physical Science and Society. Includes laboratory and tutorial. 4 hrs.
Topics include atomic structure, simple nuclear reactions, atomic energy and its uses, energy crisis, cold war, simple Newtonian mechanics, probability, introductory astronomy and cosmology, and the evolution of man. Prerequisite: Level I placement in mathematics.

Human Awareness. Includes laboratory and tutorial. 4 hrs.
A presentation of basic concepts and their relationship to society in the area of genetics and genetic engineering, aging, human sexuality, contraception, venereal disease and drugs. Prerequisite: Level I placement in mathematics.

Physics

Professor: Castle; Associate Professors: Chan, Davis, Rush, Sung, Smalley (chairman); Assistant Professor: Harrington; Adjunct Professor: Stettler; Research Professor: McKnight; Associate Research Professors: Hendricks, Kidron; Assistant Research Professors: Otto, Walter

Undergraduate Programs

The basic courses for a B.S. degree with a major in physics include: PH 101, 102, 201, 241, 310, 311, 312, 321, 331, 351. PH 101-102 may be omitted with permission of the physics department chairman. Three approved AOC's are listed. Other AOC's may be approved after consultation with the student's faculty advisor.

Curriculum I

For Working Professionally at the B.S. Level or preparation for Graduate School

<table>
<thead>
<tr>
<th>Semester</th>
<th>Hours</th>
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<tbody>
<tr>
<td>General Education Requirements (humanities and social sciences)</td>
<td>30-36</td>
</tr>
<tr>
<td>Physics—PH 101, 102, 201, 241, 310, 311, 312, 321, 331, 337, 351, 401, 431, one senior lab at 400 level, 551-552</td>
<td>43</td>
</tr>
<tr>
<td>Mathematics—MA 153, 154, 233, 244, 251, 352, 501, 521</td>
<td>24</td>
</tr>
<tr>
<td>Chemistry—CH 121-123, 125, 126</td>
<td>8</td>
</tr>
<tr>
<td>Electives</td>
<td>20-26</td>
</tr>
</tbody>
</table>

Curriculum II

Natural Science AOC with Emphasis on Physics

<table>
<thead>
<tr>
<th>Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Requirements (humanities and social sciences)</td>
<td>30-36</td>
</tr>
</tbody>
</table>
Physics—PH 101, 102, 104, 105, 201, 241, 310, 311, 331, 351 28
Chemistry—CH 121-123, 125, 126, 331, 332, 333, 335 15
Mathematics—MA 153, 154, 233, 244, 251, 352 18
Biology—BY 113-114, 319, 317 or 354 14
Electives 19-25

Curriculum III

AOC with Physics Major for Class B Secondary Professional Teaching Certificate

<table>
<thead>
<tr>
<th>General Education Requirements (humanities and social sciences)</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics—PH 101, 102, 104, 201, 241, 310, 311, 312, 321, 331, 351</td>
<td>30-36</td>
</tr>
<tr>
<td>Mathematics—MA 153, 154, 233, 244, 251</td>
<td>15</td>
</tr>
<tr>
<td>Chemistry—CH 121, 123, 125, 126</td>
<td>8</td>
</tr>
<tr>
<td>Biology—BY 113</td>
<td>4</td>
</tr>
</tbody>
</table>

With Chemistry Cluster:

| Chemistry—CH 223, 331, 332, 333, 341, 342 or (335, 336) | 15 |
| Education core | 21 |
| Electives | 0-4 |

With Mathematics Cluster:

| Mathematics—MA 333, 442, 385 or 585 | 9 |
| Education core | 21 |
| Electives | 4-10 |

With Biology Cluster:

| Biology—BY 114-221, 319, 320, 5 hours elective | 18 |
| Education core | 21 |
| Electives | 0-1 |

Graduate Programs

The physics faculty offers programs of study leading to the Master of Science degree under Plan I or Plan II and to the Doctor of Philosophy degree.

General information about the Graduate Programs at UAH and the general requirements for advanced degrees are given in the section on Graduate Studies and
Research. Besides meeting the 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. The purpose of this examination is to help the student and his advisor decide on the best program of study. After taking the placement examination, the student must complete a Program Approval Form in consultation with his advisor.

Master of Science

Each student is required to take PH 792 (Physics Seminar) for two terms. For the Master of Science degree under Plan II, the following courses are required: PH 601, 622, 631, 632, 651 and 652. Each candidate for the Master of Science degree must also pass the Comprehensive Examination. This examination will normally be administered during the spring term.

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 upon the performance on the Master of Science Comprehensive Examination. Students entering UAH with an M.S. degree or previous graduate training in physics are required to take the M.S. Comprehensive Examination at their earliest opportunity.

A minimum of 48 hours of graduate course credit is required for the Ph.D. degree in physics. Physics 601, 622, 631, 632, 651, 652 and a minimum of twelve credit hours in courses of approved selected topics or courses numbered 600 or above must be taken. Courses in addition to those enumerated above will be selected in consultation with the student’s advisory committee. Transfer of credit from other institutions requires the approval of the graduate faculty in physics. Although a minor subject is not required, the student is encouraged to develop an interdisciplinary program of study.

In order 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 is designed to test the student’s fitness for pursuing a research project in his chosen area and to test 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 are listed in the interest of the students. Prerequisites may be waived by the instructor or the department chairman for auditors or students with equivalent experience.
101 General Physics 4 hrs.
An introductory course intended for science and engineering students. Intended to be phenomenological in nature with emphasis on understanding basic ideas of physics and ability to apply these ideas to specific problems. Subjects covered include Newtonian mechanics, conservation laws, electrostatics, and currents. Includes laboratory. PH 101-102 satisfy laboratory science requirement. Prerequisite: high school algebra. Fall, Winter, Summer.

102 General Physics 4 hrs.
Continuation of PH 101. Includes laboratory. Subjects covered include: magnetic phenomena, relativity, waves, quantum nature of matter. Prerequisite: PH 101. Winter, Spring, Summer.

104 Astronomy of the Solar System 3 hrs.
Includes laboratory telescope observation. Prerequisite: high school algebra and trigonometry. Winter.

105 Stellar Astronomy 3 hrs.
Continuation of PH 104, telescope observation. Includes laboratory. Prerequisite: PH 104. Spring.

201 Mechanics 3 hrs.
Galilean invariance; energy and momentum; non-relativistic particle kinematics and dynamics; harmonic oscillator; Lorentz transformations; relativistic momentum, energy, and dynamics. Prerequisite: PH 101 or 109. Prerequisite or parallel: MA 233. Fall, Spring.

241 Waves and Oscillations 3 hrs.
Introduction to periodic phenomena, free oscillators, forced oscillators, traveling waves, modulation and Fourier analysis. Prerequisite: PH 201. Prerequisite or parallel: MA 244. Winter, Summer.

310 Intermediate Laboratory I 1 hr.

311 Intermediate Laboratory II 1 hr.
Electronic instrumentation, electric fields, motion of charged particles. Prerequisite or parallel: PH 331. Spring.

312 Intermediate Laboratory III 1 hr.
Electric circuits, acoustics and fluids, optics. Prerequisite: PH 311. Fall.

321 Thermal and Statistical Physics 3 hrs.
Microscopic systems, equilibrium, heat and temperature, irreversibility; probability and statistics; thermal interactions, approach to equilibrium, mean energy and pressure of ideal gas; microscopic theory, absolute temperature, entropy, canonical distribution, and equipartition of energy. Prerequisite: PH 331. Winter.

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 equations. 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, use of above in laboratory instruments. Laboratory included. Prerequisite: PH 331. Summer.
351 Quantum Physics
Quantum hypothesis, physical quantities, theory of measurement; uncertainty principle, energy levels; photons; particles, de Broglie waves; phenomenological wave mechanics, Schrödinger's wave equation, hydrogen-like systems, interactions. Prerequisite: PH 241, 331. Spring.

401 Intermediate Mechanics
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, Summer.

412 Optics and Spectroscopy Laboratory
Experiments in geometrical optics including image formation and aberrations, study of diffraction gratings, plane and concave grating spectographs, photoelectric and photographic spectroscopy, analysis of spectra. Offered upon demand.

413 Nuclear Physics Laboratory
Statistics in counting processes, beta-ray continuum, scintillation spectroscopy, coincidence spectroscopy, Mössbauer effect, selected experiments in modern techniques. Offered upon demand.

414 Solid State Physics Laboratory
Fundamental solid state experiments, including electron paramagnetic resonance, nuclear magnetic resonance, Hall effect, cyclotron resonance, Mössbauer spectroscopy. Offered upon demand.

415 X-Ray Laboratory
Powder and single crystal x-ray photography with theory as needed. Offered upon demand.

416 Senior Laboratory.
Selected experiments from PH 412-415.

420 Senior Thesis.
Semi-original work performed under the direction of a faculty member.

431 Intermediate Electricity and Magnetism
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. Prerequisite: PH 331, MA 352. Spring.

506 Introduction to Physics of the Solar System
Development and discussion of the fundamentals necessary for understanding of the solar system and the major modern trends. Prerequisite: PH 431. Offered upon demand. Fall.

521 Thermal Physics
An introduction to thermal phenomena, both on a macroscopic and on a statistical basis, and to the principles and laws governing them. Prerequisite: PH 431. Summer.

531 Introduction To Plasma Dynamics
Plasma kinetic theory, including charged-particle and neutral collision, ionization, electronic excitation and recombination, motion of charged particles, macroscopic equations; transport coefficients, gas discharges, instabilities, sheath and oscillation electromagnetic waves and radiation. See EG 559. Prerequisite: PH 431 and PH 321.
536 Introduction to Space Physics
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

551 Introductory Quantum Mechanics
Background of the 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. Prerequisite: PH 351, 401, 431. Fall. Same as CH 553.

552 Introductory Quantum Mechanics
Continuation of PH 551. Prerequisite: PH 551. Winter. Same as CH 554.

561 Introduction to Solid State Physics
Crystal diffraction, the reciprocal lattice binding energies, phonons, thermal properties of insulators, free electron gas and energy bands in crystal. Prerequisite or parallel: PH 551. Winter.

565 Introduction to Nuclear Physics
Stable nuclei, isotopes, nuclear reactions, nuclidic masses, binding energy, scattering experiments, nuclear cross sections, spins, energy levels, nuclear models. Prerequisite or parallel: PH 552. Winter.

571 Introduction to Elementary Particles
Invariance principles and quantum numbers, symmtery schemes, scattering and reactions, resonances, strong-interaction dynamics, and weak interactions. Prerequisite: PH 552. Spring.

601 Classical Dynamics
Variational principles and Lagrangian mechanics, rigid body motion, Hamilton's equations, and the theory of small oscillations. Emphasis is on those aspects related to modern physics. Prerequisite: PH 401. Prerequisite or parallel: MA 521. Fall.

607 Mathematical Methods I
Review of vector calculus and coordinate systems, calculus of residues, partial differential equations, orthogonal functions, special functions. Prerequisite: MA 521. Fall.

609 Mathematical Methods II
Tensor analysis, matrices and group theory, integral transforms, integral equations, Hilbert space. Prerequisite: PH 607. Winter.

622 Kinetic Theory and Statistical Mechanics
Review of thermodynamics, kinetic theory, classical statistical mechanics, canonical and grand canonical ensembles, quantum statistical mechanics, Bose and Fermi statistics, the partition function. Prerequisite: PH 521, 552, MA 521. Spring.

631 Electromagnetic Theory I
Electromagnetic Theory II

Optics II
Selected topics from advanced optics including Fresnel and Fraunhofer diffraction, theory of aberrations, theory of partial coherence including laser applications. Prerequisite: PH 541. Spring, 1975 and alternate years.

Quantum Mechanics I
Review of basic principles, general formulation in Hilbert space, angular momentum, steady-state perturbation theory, scattering theory and applications. Prerequisite: PH 552, 601, 609, MA 523. Spring.

Quantum Mechanics II
Identical particles, symmetry principles, time-dependent perturbation theory, variational principles, formal scattering theory. Prerequisite: PH 651. Summer.

Intermediate Solid State Physics
Topics surveyed include semiconductor crystals, superconductivity, dielectric polarization, ferroelectric crystals, diamagnetism, paramagnetism, ferromagnetism, antiferromagnetism, magnetic resonance, optical phenomena in insulators, point defects and dislocations. Prerequisite: PH 561 or equivalent; Prerequisite or parallel PH 631. Spring.

Selected Topics
Offered upon demand. Previous topics include: Superconductivity, optical properties of solids in the infrared, laser propagation, collision theory and quantum electronics and microwave properties of solids.

Master's Thesis
A minimum of two terms required for M.S. students. A maximum of 9 hours of credit is awarded upon successful completion of the master's thesis.

Advanced Classical Dynamics
Review of Lagrangian and Hamiltonian dynamics, canonical transformation, Hamilton-Jacobi theory, Lagrangian field theory, selected topics. Prerequisite: PH 601. Offered upon demand.

Relativity
A study of the special and the general theory, with emphasis on a covariant formulation of electrodynamics. Prerequisite: PH 601, 631. Offered upon demand.

Kinetic Theory and Statistical Mechanics
Advanced topics in kinetic theory and statistical mechanics. Prerequisite: PH 622. Offered upon demand.

Advanced Quantum Mechanics
Relativistic wave equations, second quantization, interacting fields, Feynman techniques. Prerequisite: PH 652.

Advanced Solid State Physics
Selected topics from quantum theory of solid state physics including many-body technique, transport properties, optical properties, superconductivity. Prerequisite: PH 652, 661. Fall.
Selected Topics 3 hrs.
Offered upon demand. Previous topics include: Superconductivity, optical properties of solids in the infrared, laser propagation, collision theory and quantum electronics and microwave properties of solids.

Physics Seminar No Credit
Students report on journal articles or individual research. Prerequisite: PH 552. Two terms required for M.S. students. Fall, Spring.

Doctoral Dissertation 3, 6, or 9 hrs.

Engineering

Department of Electrical Engineering
Professors: Audeh, Dowdle, Halijak, Johnson, Polge; Associate Professors: Blevins, Thurstone (chairman); Assistant Professors: Kheir, Fronek; Adjunct Associate Professor: Doane

Department of Industrial and Systems Engineering
Professor: Shannon; Associate Professors: Brown (chairman), Wyskida; Visiting Assistant Professor: Abou-Zeid; Instructor: Wilhelm; Adjunct Associate Professor: Bucher

Department of Mechanical Engineering
Professors: Grohse, Kubitza, Liu, Shih, Wu; Professor Emeritus: Hermann; Associate Professors: Brainerd (chairman), Chung, Thompson; Assistant Professor: Wallace; Assistant Research Professors: Hung, Karr; Adjunct Associate Professors: Head, Rheinfurth

Degrees and Programs
The School of Science and Engineering offers programs leading to the degree 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 the requirements for admission or for graduation, and change the degrees to be awarded.

Requirements for an Engineering Cluster
Students in other schools of the University who wish to prepare themselves for a full role in technological society may develop a cluster in engineering. A minimum of 21 semester hours of engineering courses should be chosen with the assistance of an engineering advisor.
Course Numbers

The course numbering system of UAH is coded for engineering courses so that the second digit indicates the engineering department as follows:

<table>
<thead>
<tr>
<th>Middle Digit</th>
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</thead>
<tbody>
<tr>
<td>0-1</td>
</tr>
<tr>
<td>2-3</td>
</tr>
<tr>
<td>4-7</td>
</tr>
</tbody>
</table>

Electrical Engineering
Industrial and Systems Engineering
Mechanical Engineering

The General Engineering courses are identified by the middle digits 8 or 9.

Undergraduate Engineering Program

Bachelor of Science in Engineering Degree Program

The engineering program has as its primary objective the preparation of qualified students for careers in any one of many engineering disciplines, for research, and for advanced studies. It stresses a broad education in mathematics, physical sciences, liberal arts, social sciences, engineering science, and engineering design and synthesis.

The School of Science and Engineering achieves this goal by offering a unified program of undergraduate engineering studies that will serve as an effective foundation for creative participation in most areas of engineering, especially those associated with newly evolving technologies. All engineering students follow a common curriculum with specialization in the junior and senior years in such areas as electrical engineering, industrial and systems engineering, mechanical engineering, or structural engineering. Electrical Engineering and Industrial and Systems Engineering options are accredited by the Engineers' Council for Professional Development (ECPD). The other options are under preparation for ECPD accreditation evaluation.

A student will be awarded the degree of Bachelor of Science in Engineering upon successful completion of all requirements, including a minimum of 129 semester hours of course work.

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 the time required for graduation. Counseling and advising should be sought from the appropriate department or from the Office of the Dean. A student enrolled in the Bachelor of Science in Engineering programs should pursue courses in each of the following eight categories:

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. English Composition—EH 101, 102</td>
</tr>
</tbody>
</table>
2. Basic Science
   General Physics—PH 101, 102  
   Electricity and Magnetism—PH 331 (EG 307)  
   Chemistry—CH 121, 125  

3. Mathematics
   Calculus and Analytic Geometry—MA 153, 154, 233, 251  
   Linear Algebra—MA 244  
   Differential Equations—MA 352  

4. Humanities and Social Sciences
   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. The remaining twelve 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.

5. Engineering Core
   Statics—EG 171  
   Freshman Seminar—EG 195  
   FORTRAN Programming—EG 196  
   Engineering Graphics—EG 198  
   Electrical Circuits I—EG 201  
   Production and Operations—EG 220  
   Thermodynamics I—EG 241  
   Fluid Mechanics—EG 242  
   Particle Dynamics—EG 263  
   Mechanics of Materials—EG 273  
   Nature and Properties of Materials—EG 294  
   Electronics and Instrumentation Lab—EG 301  
   Electronics and Instrumentation—EG 311  
   Engineering Economy—EG 321  
   Operational Methods—EG 381  
   Probability and Statistics—EG 390  
   Numerical Methods and Computations—EG 396  
   Dynamical Processes—EG 487  
   Engineering Systems—EG 488  
   Engineering Design—EG 493, 494
Students are required to take one of the following options, which are listed under the cognizant departments below:

ELECTRICAL ENGINEERING DEPARTMENT

Electrical Engineering Option:

The electrical engineering option offers a background that will enable students to pursue careers in any of the many and diverse facets of electrical engineering such as electronics, networks, power systems, instrumentation, computers communications, and controls. Additionally, the student may select advanced undergraduate courses to develop his or her individual and specific interests.

<table>
<thead>
<tr>
<th>Semester Hours</th>
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<tbody>
<tr>
<td><strong>Electrical Circuits Laboratory—EG 303</strong></td>
<td>1</td>
</tr>
<tr>
<td><strong>Electronics Laboratory—EG 305</strong></td>
<td>1</td>
</tr>
<tr>
<td><strong>Electrical Circuits II—EG 313</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Electronics I—EG 316</strong></td>
<td>2</td>
</tr>
<tr>
<td><strong>Electrical Engineering Elective</strong></td>
<td>3</td>
</tr>
</tbody>
</table>

Group Elective (choose a,b,c)

- **Electronics Laboratory—EG 406** | 1 |
- **Electromagnetic Waves—EG 407** | 3 |
- **Electronics II—EG 416** | 3 |
- **Logic Circuits—EG 502** | 3 |
- **Digital Electronics—EG 516** | 3 |
- **Digital Electronics Laboratory—EG 519** | 1 |
- **Electrical Networks Laboratory—EG 404** | 1 |
- **Electric Power Systems—EG 411** | 3 |
- **Passive Electrical Networks—EG 414** | 3 |

INDUSTRIAL AND SYSTEMS ENGINEERING DEPARTMENT

Industrial and Systems Engineering Option:

Industrial and systems engineering is concerned primarily with the 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 the needs of the ultimate users of engineering systems.
Probability and Engineering Statistics II—EG 421  3
Systems Analysis—EG 422      2
Management Systems Analysis—EG 427  3
Introduction to Human Engineering—EG 524  3
Operations Research I—EG 525  3
Industrial and Systems Engineering Elective  3

MECHANICAL ENGINEERING DEPARTMENT

Mechanical Engineering Option:

Mechanical Engineering is a broad field which traditionally is considered to comprise three primary sub-fields: 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, etc.) to other forms of useful energy (for transportation, heat, light, power, etc.); the design and production of machines to lighten the burden of servile human work and to do work otherwise beyond human capability; the processing of materials into useful products; and the creative planning, development, and operation of systems for using energy, machines, and resources.

Thermodynamics II—EG 342  3
Heat and Mass Transfer—EG 442  4
Kinematics and Dynamics of Rigid Bodies—EG 364  4
Mechanics and Design of Machine Elements—EG 466  3
Elective in Mechanical Engineering  3

Structural Engineering Option:

The structural engineer applies the fundamentals of engineering, human factors, and economics to the analytic design and construction of a wide variety of structural and mechanical systems including bridges, high-rise and industrial buildings, machines and hoists, transmission lines and towers, dams and locks, tunnels and pipe lines, and structural and mechanical systems for aircraft, missile, space, military and marine applications.
7. Approved Technical Electives

Selection of 6 semester hours of technical electives should be made with the assistance of an engineering counselor and should complement the area of professional specialization chosen. In addition, these electives should clearly support the student’s goals. Such elective courses must be numbered 300 or above and have the approval of the chairman of the department.
## B.S.E. CURRICULUM

<table>
<thead>
<tr>
<th></th>
<th>FALL</th>
<th>WINTER</th>
<th>SPRING</th>
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<tbody>
<tr>
<td></td>
<td>MA 153 3 Hrs.</td>
<td>MA 154 3 Hrs.</td>
<td>MA 233 3 Hrs.</td>
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<tr>
<td>FRESHMAN</td>
<td>PH 101 4 Hrs.</td>
<td>PH 102 4 Hrs.</td>
<td>CH 121 3 Hrs.</td>
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<td>EH 101 3 Hrs.</td>
<td>EH 102 3 Hrs.</td>
<td>CH 125 1 Hr.</td>
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<td>EG 198 2 Hrs.</td>
<td>EG 195 1 Hr.</td>
<td>EG 171 2 Hrs.</td>
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<td>12 Hrs.</td>
<td>11 Hrs.</td>
<td>11 Hrs.</td>
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<td>34 Hrs.</td>
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<td></td>
<td>MA 251 3 Hrs.</td>
<td>MA 244 3 Hrs.</td>
<td>EG 321 3 Hrs.</td>
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<tr>
<td>SOPHOMORE</td>
<td>EG 220 3 Hrs.</td>
<td>+ 3 Hrs.</td>
<td>EG 242 2 Hrs.</td>
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<td>EG 263 2 Hrs.</td>
<td>EG 273 3 Hrs.</td>
<td>EC 142 3 Hrs.</td>
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<td>EG 294 3 Hrs.</td>
<td>9 Hrs.</td>
<td>MA 352 3 Hrs.</td>
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<td>11 Hrs.</td>
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<td>11 Hrs.</td>
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<td>31 Hrs.</td>
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<td></td>
<td>EG 201 3 Hrs.</td>
<td>EG 381 2 Hrs.</td>
<td>EG 307 3 Hrs.</td>
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<tr>
<td>JUNIOR</td>
<td>EG 241 3 Hrs.</td>
<td>EG 301 1 Hr.</td>
<td>EG 390 3 Hrs.</td>
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<td>EG 396 2 Hrs.</td>
<td>EG 311 3 Hrs.</td>
<td>* 6 Hrs.</td>
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<td>* 3 Hrs.</td>
<td>* 3 Hrs.</td>
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<td>32 Hrs.</td>
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<td>EG 448 3 Hrs.</td>
<td>EG 487 2 Hrs.</td>
<td>+ 10 Hrs.</td>
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<tr>
<td>SENIOR</td>
<td>EG 493 2 Hrs.</td>
<td>+ 7 Hrs.</td>
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<td>*+ 6 Hrs.</td>
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<td>11 Hrs.</td>
<td>11 Hrs.</td>
<td>10 Hrs.</td>
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<td>32 Hrs.</td>
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<td>129 Hrs.</td>
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</tbody>
</table>

+ Humanities or Social Science electives
* Engineering option, technical or free elective (see departmental office for specifics)
8. Free Electives

In general, for 3 semester hours of free elective credit, the student may choose any course offered by UAH in which the subject matter does not duplicate the same or a lower level of courses in his program.

Graduate Engineering Programs

The School of Science and Engineering offers programs leading to the degree of Master of Science in Engineering, Master of Science in Operations Research, and Doctor of Philosophy. Specializations for the MSE 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
- Fluid Mechanics
- Systems Engineering
- Environmental Engineering
- Solid Mechanics
- Dynamics

In addition to admission requirements (for both unconditional and probationary) stated in the Graduate School section of this catalog, the following three paragraphs specify further requirements for admission (unconditional or probationary 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 attempted; (2) to have scored at least 1000 on the aptitude portion of the GRE; and (3) to have received a bachelor's degree in an engineering curriculum which was accredited by the Engineers' Council for Professional Development 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 who are considered, after an individual examination of quantity and quality of their work, to be properly prepared and capable of successfully pursuing graduate work toward an acceptable graduate objective. Students admitted provisionally are required to maintain a B average on their first twelve semester hours of graduate course work (and to remove any other conditions imposed at the time of initial enrollment) in order to be allowed to continue graduate study.
Applicants for admission to graduate study in engineering are required to take the Advanced Engineering portion of the GRE, the results of which will be considered in determining the qualification of the student to pursue successfully a program of graduate study.

Students who are admitted to the University as Irregular Post Graduates but who have been denied admission to the Graduate School because of a deficiency in quality point average (QPA) and/or GRE score may be reconsidered for graduate admission provided they are otherwise eligible to pursue a particular engineering discipline. In order to be reconsidered they must successfully complete 12 hours of courses numbered 500 or above in engineering, mathematics, physics, chemistry or biology with a QPA exceeding 2.0 on the work undertaken.

Upon admission to graduate study by the Dean of Graduate Studies and Research, the student will be referred to the appropriate department chairman. A supervisory committee, which usually is but does not have to be the same as the final examining committee, should be appointed after the student has completed 12 semester hours.

**General Requirements for the Master's Degree**

In addition to the requirements for all master's degrees specified by the School of Graduate Studies and Research, 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 or 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 will be necessary.
3. Graduate Seminars are required; EG 695 during the first 12 semester hours of the program of study and EG 795 during the active work on the thesis (Plan One) or the required paper (Plan Two).
4. 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.

**Special Requirements for the MSE Degree**

**Basic Program of Study**

The Basic Program of Study, common to both Plan One and Plan Two, contains Graduate Seminars I and II and a minimum of 24 semester hours of graduate level course work, which 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 the primary area of specialization.
(d) 6 hours of courses in mathematics beyond Differential Equations.

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 degree program Plan One must:
(a) Successfully complete an approved Basic Program of Study.
(b) Complete an acceptable thesis.
(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 600 or above, and submit an acceptable paper on the student’s independent work.
(d) Pass a comprehensive final examination.

Detailed instruction governing Plan One and Plan Two should be obtained from the Chairman of the Primary engineering department before entering the Basic Program of Study.

Special Requirements for the MSOR Degree

The Master of Science in Operations Research (MSOR) is a degree program designed primarily for graduate students with non-engineering undergraduate degrees. Operations Research is characterized by the solution of real world problems through the application of diverse methods, techniques, tools, and algorithms. The MSOR program is concerned with optimization, stochastic systems analysis, and operations research applications. Areas of application include large scale systems analysis, the analysis of urban and socio-economic systems, and the management sciences.

Admission to the Program

The requirements for admission to this program shall conform to the policies of the Graduate School of the University. In addition the following prerequisites will be required:

1. A minimum score of 500 on the quantitative portion of the general Graduate Record Examination.
2. Mathematics through the calculus (MA 251).
3. Six hours of either applied or mathematical statistics.

Program of Study

The Program of Study contains Graduate Seminar I, II, and a minimum of 24 semester hours of graduate level course work, which must include:
(a) 12 semester hours of graduate credit courses in operations research, including EG 525, 625, and 629.
(b) 6 hours of courses in an approved minor area.
(c) 6 hours in mathematics.
(d) an acceptable thesis.

Detailed information governing the MSOR 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 the essential considerations in awarding the Ph.D. degree.

In addition to the minimum requirements of the Graduate School for the granting of all graduate degrees, some special minimum requirements must be met by doctoral students in engineering. These are set forth below:

Admission to the Ph.D. Degree Program

Admission to the Ph.D. program is separate from admission to the Graduate School, even though a candidate must be admitted to Graduate School before being admitted to the 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 successfully pursue 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 will be 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 and/or oral test of the student's knowledge in the major and minor fields of study and will be administered by the applying student's advisory committee. An applicant must pass this examination in order to be admitted to candidacy for the Ph.D. degree. The following conditions must be satisfied prior to 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 the advisory committee to be adequately prepared in his major and minor fields.

3. The Final Examination (or dissertation examination) will primarily concern the research work that is 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 that will be chosen with the 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 Graduate Studies and Research.

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 advisor appointed by the chairman of the department shall direct the student's work until the Preliminary Examination is successfully completed. Thereafter the student shall immediately choose an advisory committee, subject to the acceptance of the faculty members so chosen, and the approval of the School of
Science and Engineering and the Graduate School. This committee shall consist 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 and/or third year of graduate study in the Graduate School at UAH. Half-time graduate assistants are required to complete a minimum of 18 hours of graduate work in three consecutive terms.

Language Requirements

The student must satisfy the language requirement prior to applying for permission to take the Qualifying Examination in one of the ways specified by the Graduate School language requirements or by demonstrating, during graduate study, a knowledge of only one language by obtaining a B average in a four-course sequence of college-level courses in that language.

Dissertation Registration

Students must register for a minimum of 18 semester hours of dissertation during the time period they are actively conducting research and consulting their dissertation advisor.

Engineering (EG)

171 Statics 2 hrs.
A study of forces and couples and the resultants of force systems, free-body diagrams, equilibrium, problems involving friction, centroids, and moments of inertia. Prerequisite or parallel: MA 233.

195 Freshmen Seminar 1 hr.
Required of all freshmen. Not open to upperclassmen.

196 FORTRAN Programming 2 hrs.
An introduction to FORTRAN programming for solving scientific problems. The course includes the basic concepts of digital computation, algorithms, flow charting. Practice in solving problems on the University computer is included. No credit to students who have completed MA/CS 113. Prerequisite: MA 133.
198 Engineering Graphics 2 hrs.
The graphical solution of problems involving the location and relationship of points, lines, planes, and surfaces of revolution by the Mongean and direct methods.

201 Electrical Circuits I 3 hrs.
Electric and magnetic circuit concepts; transient and steady-state solution of simple circuits. Phasor analysis of ac circuits and network theorems. Prerequisite: PH 102, MA 251, and/or parallel, EG 196. (MA 352 will be an added prerequisite in the Fall of 1976.)

220 Introduction to Production and Operations Management 3 hrs.
A comprehensive introduction to the industrial organization, its structure, environment, functions and systems as well as to industrial engineering, its role and methods. Includes the production function, cost data, capital costs, investment criteria, production design, network planning, plant location, layout, the design of jobs and work methods, production standards and work measurement; also laboratory work in time and motion study. Not open to seniors.

241 Thermodynamics I 3 hrs.
Study of basic laws of energy which apply in all branches of engineering and science. Topics include properties of matter, state variables, reversible processes, first and second laws of thermodynamics with applications to closed and open systems; availability of energy, and irreversibility. Prerequisites: MA 251, CH 121.

242 Fluid Mechanics 2 hrs.
Properties of fluids and fundamental principles governing fluid motion, including fluid statics, conservation of mass, momentum and energy with applications to pipe and channel flows of incompressible fluids. Prerequisites: EG 263, MA 251.

263 Particle Dynamics 2 hrs.
Kinematics of a particle, Newton's laws, linear and angular momentum, work and energy, conservation laws, relative motion. Laboratory demonstrations are included. Prerequisite: EG 171.

273 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. Laboratory experiments and demonstrations included. Prerequisites: EG 171, MA 251.

An introductory course covering the structure of matter; basic concepts of phase transformations; mechanical, electrical, magnetic, and thermal properties; and corrosion. Approximately 1 semester hour of course work is devoted to laboratory experiments and 2 hours to lecture. Prerequisite: CH 121, PH 102.

301 Electronics and Instrumentation Laboratory 1 hr.
Experiments related to elementary electronic instrumentation, solid state semiconductor devices, amplifying circuits, and experiments using the analog computer. Must parallel with EG 311.

303 Electrical Engineering Laboratory 1 hr.
Experiments related to electrical circuits and to apply and verify the principles presented in EG 313. Prerequisite or parallel: EG 313.

305 Electronics Laboratory 1 hr.
Experiments and reports related to amplifiers using bipolar, JFET, MOSFET devices. Emphasis is placed on original design of individual circuits. Prerequisite: EG 301 and must parallel EG 316.
307 Electricity and Magnetism (See PH 331) 3 hrs.
Basic concepts of electrostatics, electric potential theory, electric fields and currents, fields of moving charge including relativistic treatment, magnetic fields, Maxwell's Equations. Prerequisite: EG 263, MA 244, PH 102.

309 Switching Theory 3 hrs.
Techniques for the analysis and design of combinational and sequential switching networks; Boolean algebra, elements of code theory; minimum complexity combinational networks; threshold logic; functional decomposition; minimum complexity sequential networks; asynchronous sequential networks. Prerequisite: junior standing. Same as CS 309.

311 Electronics and Instrumentation 3 hrs.
A study of electronic devices such as solid state and vacuum diodes, triodes and transistors, amplifiers, rectifiers, voltmeters, ammeters, display devices, simple instrumentation systems, and introduction to analog computers. Prerequisite: EG 201 and must parallel EG 301.

313 Electrical Circuits II 3 hrs.
Steady-state response to sinusoidal driving functions, polyphase circuits, transfer functions, resonance, magnetically coupled circuits; basic concepts of network topology and analysis, matrix formulation of network equations; algorithms. Prerequisite: EG 381.

316 Electronics I 2 hrs.
Analysis of large and small signal electronic devices; piece-wise linear models of bipolar and FET devices; amplifiers, power supplies, and special circuit applications. Prerequisite: EG 311.

321 Engineering Economy 3 hrs.
Deals with economic evaluation of engineering alternatives. Topics include interest, depreciation, time-value of investments, learning curves, income tax, break even and minimum cost analysis, and replacement analysis. Prerequisite: EC 142, MA 154.

342 Thermodynamics II 3 hrs.
Continuation of EG 241. Topics include thermodynamic cycles, thermodynamic relations among properties, chemical reactions, and phase and chemical equilibrium. Prerequisite: EG 241.

344 Heat Transfer 2 hrs.
Basic principles of heat transfer and applications to problems of conduction and radiation; introduction to convective heat transfer. Prerequisites: EG 252, MA 251. (Course will be discontinued after September 1, 1976.)

350 Fluid-Thermal Systems 2 hrs.
Analysis of fluid and thermal systems utilizing the basic principles of thermodynamics and fluid mechanics along with the control volume concept. Applications to environmental control, power and refrigeration cycles, and compressible flow through nozzles and turbo-machinery. Prerequisites: EG 242, EG 252. (Course will be discontinued after September 1, 1976.)

357 Fluid-Thermal Laboratory 1 hr.
Use of techniques and instrumentation for experimental verification of fundamental principles of thermodynamics, fluid mechanics and heat transfer. Prerequisite: EG 242, EG 252. Parallel: EG 344. (Course will be discontinued after September 1, 1976.)

359 Fluid-Thermal Laboratory 1 hr.
Laboratory in fluid mechanics, thermodynamics, and related areas. Typical experiments included are: flows in pipes and channels, flow control devices, verification of gas laws, compressible flow and engine performance and emission control. Prerequisites: EG 241, 242.
Kinematics and Dynamics of Machines
A study of plane and spatial rigid body motion including energy and momentum principles. Kinematics and dynamics of mechanisms and machines; graphical analytical methods of velocity, acceleration, and force analyses. Laboratory includes dynamic force and motion analysis, graphical mechanism synthesis, and dynamic balancing. Prerequisite: EG 263.

 Structural Analysis I

 Elements of Structural Design
Basic principles of design of metallic and non-metallic structures. Analysis and design of structural elements including beams, columns, connection details, and footings. Prerequisite: EG 371.

 Materials and Manufacturing Processes

 Operational Methods in Engineering
A study of Fourier Series, Fourier and Laplace transforms with emphasis on their physical interpretation. System representation by transfer functions and impulse response functions. The convolution integral. Prerequisites: EG 201.

 Probability and Engineering Statistics I
An introduction to the 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. Topics also include applications of statistical sampling, estimation, and hypothesis testing of means, variances and proportions. Prerequisite or parallel: MA 251.

 Numerical Methods and Comutations
Introduction to numerical techniques frequently associated with complex problems. In particular, emphasis is placed on evaluation of functions, finding roots of equations, solution of simultaneous algebraic equations and differential equations. Use of the University computer is included. Prerequisite: EG 196 and MA 352.

 Selected Topics in Engineering
Prerequisite: Permission of Instructor.

 Electrical Networks Laboratory
Experiments that apply and verify the principles presented in EG 381 and 414. Prerequisite or parallel: EG 414.

 Electronics Laboratory
Experiments and reports related to electronic devices such as oscillators, multi-stage amplifiers, modulation and switching circuits; emphasis is placed on integrated circuits and micro-electronics methods. Prerequisite: EG 305 and must parallel with EG 416.

 Electromagnetic Waves
Transient waves, steady state waves on transmission lines, Smith chart, line matching, plane waves and waveguides. Laboratory experiments are included. Prerequisite: EG 307 (PH 331).
411 Electric Power Systems 3 hrs.
Introduction to 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 networks; introduction to
filter theory and approximations for idealized network characteristics. Prerequisite: EG
313.

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, design of a digital
computer. Prerequisite: EG 309. Same as CS 415.

416 Electronics II 3 hrs.
Integrated circuits and micro-devices related to multi-stage amplifiers, oscillators, design
specifications, operational amplifiers, and micro-circuits. Prerequisite: EG 313, 316 and
must parallel with EG 406.

421 Probability and Engineering Statistics II 3 hrs.
A continuation of EG 390 with emphasis on regression analysis, analysis of variance, and
non-parametric statistics. Includes introduction to design of engineering experiments,
quality control, and computer solution of large scale problems. Prerequisite: EG 390.

422 Systems Analysis 2 hrs.
An introduction to the philosophy and methods of industrial and non-industrial systems
analysis. Methods of systems definition, analysis, simplification, methods of provision of
control and information feedback, and methods of systems evaluation are presented and
illustrated. A group design project is required. Prerequisite: MA 251 and senior standing.

427 Management Systems Analysis 3 hrs.
A systems approach to the study of formal organizations. Presents analytical techniques
for making decisions about organizational design. Prerequisite: EG 220, 390.

442 Introduction to Heat and Mass Transfer 4 hrs.
Study of the basic principles of heat and mass transfer; the application of these
principles to problems in conductive, convective, and radiative heat transfer and mass
transfer; both laminar and turbulent flow processes are included. One credit hour
laboratory included. Prerequisite: EG 241, 242; Parallel: MA 352.

446 Analysis and Design of Energy Systems 3 hrs.
Application of the principles of heat transfer, thermodynamics, and fluid mechanics to
the analysis and design of systems for the storage and transport of energy. Topics
include: heat exchanges, heat pipes, thermal storage systems, heating and air condition-
ing. Prerequisites: EG 241, 442.

466 Mechanics and Design of Machine Elements 3 hrs.
Detailed design and selection of machine elements, such as gears, shafts and bearings.
Topics include analysis of stresses and deformations under combined static and dynamic
loads, stress concentrations, and fatigue. Prerequisites: EG 273, 364.

471 Structural Analysis II 2 hrs.
Reactions, shears, moments and deformations in complex structural systems. Statically
487 Analysis and Control of Dynamical Processes 2 hrs.
A course designed to introduce the scientifically-oriented student to the "systems approach" for the study of a variety of dynamical processes found in engineering, economics, biology, sociology, psychology, etc. Problems studied include the analysis of existing systems and the problems of synthesizing closed-loop feedback controllers to achieve improved performance, stability, etc. Prerequisite: 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 are treated. Prerequisite: EG 381 and senior standing.

493 Introduction to Engineering Design 2 hrs. Lab
Study and application of basic design principles and concepts. Lecture topics include design methodology, decision making, creativity, product liability, pricing and profit, scheduling, patents, and others. Course work includes team design projects and the development of a proposal for a design project for implementation in EG 494. Prerequisites: EG 273, 311, 241.

494 Engineering Design 2 hrs. Lab
Continuation of EG 493 leading to the design of an engineering system. Prerequisite: EG 493.

496 Selected Topics in Engineering. Credit to be arranged.

502 Logic Circuits 3 hrs.
Boolean algebra, binary, reflected, star and Karnaugh arrays; function representation, reduction and realization by contacts and gates; one-to-one transformations and sub-transformations; symmetric switching functions with applications to adders, subtractors; binary order detectors and applications. Not open for credit to students who are in Computer Engineering Option. Prerequisite: senior or graduate standing.

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 non-linear differential equations. Introduction to analog/digital (Hybrid) simulation techniques. Laboratory sessions. Two credit hours for lecture and one credit hour for laboratory work. Prerequisite: EG 311 and 381 or MA 352.

504 Instrumentation 3 hrs.
A study of measurement techniques and conventional and electronic instruments. The construction, theory of operation, and proper use of bridge circuits, oscilloscopes, transducers, and digital instruments. Prerequisite: EG 311.

505 Automatic Control Theory 3 hrs.
An introduction to the theory common to all feedback control systems. Topics include transfer functions, stability criteria, and frequency response. Prerequisite: EG 381.

506 Communication Theory 3 hrs.
The transmission of information, including the effects of networks, modulation systems, noise, and the use of statistics in the analysis of information transmission. Prerequisite: EG 381.

511 Machine & Assembly Language Programming 3 hrs.
Machine and 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, loops and input-output subroutines; use of a macro-assembly language; sorting, merging, arrays, and data fields in data
processing. Not open to students who have taken EG 308. Prerequisite: CS 113 or EG 196. Same as CS 511.

512 Compiler Construction 3 hrs.
Review of program language structures, translation, loading, execution, and storage allocation. Compilation of simple expressions and statements. Organization of a compiler including compile-time and run-time symbol tables, lexical scan, syntax scan, object code generation, error diagnostics. Use of compiler writing languages. Prerequisite: EG 517. Same as CS 512.

513 Digital Computer Systems 3 hrs.
Examination of the architecture of selected third generation computers; organization of various computer processors; study of computers with single and multiprocessor environments; parallel processing; computer families. Prerequisite: EG 308 or EG 511. Same as CS 513.

516 Digital Electronics 3 hrs.
Non-sinusoidal generating and wave-shaping circuits, timing circuits, limiters, comparators, clamps, logic gates, multivibrators and voltage-controlled oscillators. Prerequisite EG 316.

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 structures data. Formal specification of data structures, data structures in programming languages, and generalized data management systems. Prerequisites: EG 308 or EG 511. Same as CS 517.

519 Digital Electronics Laboratory 1 hr.
Experiments and reports related to logic circuit realization of digital hardware. Emphasis is placed on RTL, DT, TT, ECL families for combinational and sequential switching circuits. Must parallel EG 516.

522 Logistics Planning and Control 3 hrs.
An evaluation of the basic nature of logistics systems. Since the engineering aspects of the production function are covered elsewhere, the emphasis is on the quantitative analysis of two networks and their interaction: the logical network for project planning and control, and the physical distribution network. Topics include charting, milestone method, line of balance, PERT-CPM, resource allocation and leveling, and maximum flow and minimum cost algorithms. Prerequisites: EG 390 or MN 502. Not open to students taking EG 635.

523 Statistical Quality Control 3 hrs.
A study of statistical theory and techniques used to control the quality of manufactured products. Prerequisite: EG 390 or EG 621.

524 Introduction to Human Engineering 3 hrs.
An introduction to the philosophy, methodology and techniques of human engineering as related to the optimum design and analysis of man/machine/environment systems. Includes laboratory work and computer applications in human engineering. Prerequisite: EG 421 or EG 621.

525 Operations Research I 3 hrs.
An introduction to the philosophy and methodology of operations research. Specific techniques introduced are: Linear programming, inventory control, simulation, and replacement analysis. Prerequisite: EG 390 or EG 621 or MA 585.

526 Design and Analysis of Experiments 3 hrs.
Covers advanced topics in statistical experiments with emphasis on the design aspect. Topics include confounding, fractional replication, factorial and nested designs. Prerequisite: EG 421 or 621.
527 Systems Simulation
Methods and procedures for simulation of complex systems. Both discrete increment and continuous time models are considered. Prerequisite: EG 196, 525.

540 Physical Properties of Fluids
Development and study of theoretical, experimental, and correlation methods for determining and predicting the thermodynamic and transport properties of various fluids. Topics include: critical properties, equations of state; vapor pressure and latent heat, heat capacity; viscosity, thermal conductivity, diffusion coefficients; phase equilibrium; heat and free energy for formation. Prerequisite: EG 342. Offered upon demand.

542 Introduction to Environmental Engineering
Study of the engineering aspects of air, water, and thermal pollution: the hydrologic cycle, water sources and uses; industrial and other sources of primary and secondary pollutants. Emphasis is placed upon the transport processes in environmental problems and in their control. Prerequisite: EG 442.

545 Gasdynamics
Fluid mechanics and thermodynamics of ideal and real gases. Topics include 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 241, 242.

550 Environmental Control
Engineering design and synthesis of environmental control systems. Particular emphasis is placed on the control of multi-phase systems with application to air pollution control and water pollution control. Prerequisite: EG 442.

552 Energy Conversion and Power Generation
Application of principles of thermodynamics and fluid mechanics to systems for energy conversion or generation of power, such as fossil fuel and nuclear steam plants, solar collectors, electric generators, hydroelectric plants, MHD generators, fuel cells, thermionic converters, and internal combustion engines. Consideration of engineering design and synthesis of typical systems including power requirements and economics. Prerequisite: EG 342.

554 Advanced Fluid Mechanics
Development of the fundamental equations of fluid mechanics, with applications to two- and three-dimensional flows. Topics include stream functions, vorticity, potential functions, and viscous flows. Prerequisite: EG 242.

558 Dimensional Analysis and Similitude
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 554. Offered upon demand only.

559 Selected Topics in Mechanical Engineering
Credit to be arranged

561 Vibrations of Elastic Systems
Dynamic response of mechanical systems: transient, oscillatory, and wave motions, flutter, and stability. Prerequisite: EG 488.

563 Intermediate Dynamics
Newtonian and Lagrangian methods applied to particles, rigid bodies and mechanical systems. Topics include balancing of rotating masses and gyroscopic motion. Prerequisite: EG 364.
570 Mechanical Behavior of Engineering Materials 3 hrs.
A study of the structure, properties and behavior of materials. Particular topics are structural defects and their influence on mechanical properties, point defects, dislocations and lattice imperfections in crystals, plastic deformation of single crystal and polycrystalline alloys, strengthening mechanism and fracture. Strain rate, time to failure and cyclic life are treated from a microscopic viewpoint. Prerequisite: EG 273, 294.

571 Applied Mechanics of Solids 3 hrs.
Analysis of stresses and strains at a point, the theories of failures, stress concentration factors, thick-walled cylinders, torsion of non-circular members, curved beams, unsymmetrical bending, and shear center. Prerequisite: EG 273.

572 Matrix Methods in Structural Mechanics 3 hrs.
Applications of matrices to the formulation and solution of linear problems in structural mechanics. Analysis of stresses, vibrations and stability of engineering structures. Prerequisite: EG 471.

579 Selected Topics in Structural Engineering Credit to be arranged

601 Linear Systems 3 hrs.
Formulation and solution by transform methods of the differential equations of linear electrical and electromechanical systems; the state equations, signal-flow graphs; discrete-time systems. Prerequisite: graduate standing.

602 Digital Computer Design 3 hrs.
Digital arithmetic; logic matrices, redundant logic circuits; flip-flops, delayors, shift registers, counters; parallel and serial adders, subtractors, multipliers, dividers, comparators, accumulators, structure of a simple digital computer, digital differential analyzer and a digital filter. Prerequisite: EG 415 or 502.

605 Control System Design 3 hrs.
Advanced study of control system synthesis by means of feedback, feedforward, minor loop and cascade techniques. Study of system designs by analog simulation. Laboratory sessions. Two credit hours for lecture and one credit hour for laboratory. Prerequisite: EG 505.

606 Statistical Communications Theory 3 hrs.
Introduction to generalized harmonic analysis. Includes correlation, convolution, power density spectra, etc. Probability and statistics. Correlation detection. Optimum linear filtering and prediction. Prerequisite: EG 506.

607 Information Theory 3 hrs.
Introduction to self-information, entropy, mutual information, and channel capacity, encoding, error detecting and correcting codes. Sampling theorem. Discrete and continuous channels. Prerequisite: EG 506.

608 Electromagnetic Field Theory I 3 hrs.

609 Electromagnetic Field Theory II 3 hrs.
A continuation of EG 608. Prerequisite: EG 608.

610 Selected Topics in Electrical Engineering Credit to be arranged
611 Antenna Theory 3 hrs.
The study of antennas and antenna arrays. Radiation patterns and impedance characteristics. Analysis of spheres, cylinders, horns, slots, microwave lenses, traveling-wave, and frequency independent antennas. Prerequisite: EG 608.

614 Linear Graphs and Electrical Networks 3 hrs.
Introduction to linear graph theory with emphasis on applications to electrical network theory, classical network equilibrium equations, formulation of the state equations, topological formulas for network functions, signal flow graph method of circuit and system analysis. Prerequisite: EG 414.

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.

618 Microwave Techniques 3 hrs.

619 Advanced Linear Control Theory 3 hrs.
Modern techniques for the analysis and design of linear control systems. Matrix formulation, multivariable control systems, state variable concepts. Linear transformations, controllability, observability, discrete-time systems. Prerequisite: EG 505.

620 Engineering Management I 3 hrs.
A study of the principles of the executive process in technical organizations. Emphasis upon the basic management functions, scientific management, planning, directing, controlling, and decision making, as they relate to the management of technical organizations and the design and implementation of management systems. Prerequisite: graduate standing.

621 Statistical Methods for Engineers 3 hrs.
Designed to introduce graduate students to the applications of probability and statistics useful in research work. Includes descriptive statistics, theoretical distribution functions, point and interval estimation, tests 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.

622 Research and Development Management 3 hrs.
Deals with those problems which are unique to the management of organizations engaged in R&D activities. Topics discussed include management control systems for R&D projects, motivation of technical personnel, problems of managing the creative person, means of increasing creativity, and the management of change. Prerequisite: EG 620.

623 Engineering Economic Analysis 3 hrs.
Mathematical models for expenditure analysis under uncertainty. Relationship between investment decision criteria and microeconomic theory. Capital planning and budgeting. Decisions involving expansion, acquisitions, replacement, and disinvestment. Prerequisite: EG 421 or EG 621.

624 Advanced Human Engineering 3 hrs.
Design, analyses and evaluation of man/machine/environment systems. Included are considerations of work space, environment, anthropometrics and simulation as related to optimization of man-system performance. Prerequisite: EG 524.
625 Operations Research II  3 hrs.
A continuation of EG 525 with emphasis on an introduction to: queueing theory, theory of games; Markov processes, sequencing and coordination problems. A team project is also required. Prerequisite: EG 421 and 525.

627 Introduction to Systems Engineering  3 hrs.
An overview of engineering analytic methods applied to the design of operational, procedural, and hardware systems. The concepts of the System Life Cycle, and the Cost-Benefit and Tradeoff Analyses are developed. The use of engineering models of components, logic, signals, and organization in Systems Analysis is explained. Prerequisite: EG 505 or 506 or 525.

628 Engineering Management II  3 hrs.
Deals with the organizational and human relations aspects of technical management. Formal and informal organizations, job satisfaction, motivation of employees, manager-employee relations, social behavior in the work situation and executive management functions as they influence the design and implementation of management systems. Prerequisite: EG 620.

A presentation of specialized techniques and recent applications in optimal seeking methods in operations research. Topics include geometric programming, heuristic programming and special emphasis on search and quasi-enumerative methodology. Prerequisite: EG 525.

631 Management Information Systems  3 hrs.
Introduction to the design of integrated information systems necessary for effective management. Includes the methods of systems design, the basic concepts of computer processing systems, the design of management information procedures and reports, and their application to mechanized and electronic data processing equipment. Prerequisite: EG 196 or CS 113.

632 Stochastic Systems  3 hrs.
Analysis of processes whose outputs are governed by probabilistic laws. Included are Gaussian processes, processes with correlated and uncorrelated variables and Markov processes. Prerequisite: EG 421, 525.

633 Industrial Forecasting and Analysis  3 hrs.
A study of industrial forecasting and smoothing. Topics covered include multivariate analysis, regression, correlation, spectrum and time series analysis, and their applications to industrial problems. Prerequisite: EG 421 or 621.

634 Value and Decision Theory  3 hrs.
A mathematical development of the 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 the value of additional information. Prerequisite: EG 525.

635 Linear Programming  3 hrs.
The application of linear programming to complex allocation problems. Methods for determining the maximum or minimum of objective functions whose variables are subject to constraints. Topics include simplex methods, degeneracy, modified simplex, transportation problems, network flows, goal programming, and sensitivity analysis. Prerequisite: EG 525.

637 Dynamic Programming  3 hrs.
A unified treatment of optimization problems arising in the study of multistage processes. Topics covered include the development of dynamic programming principles (deterministic and stochastic), discrete maximum principle and some well known search
techniques to reduce dimensionality and computational requirements. Prerequisites: EG 196, 525.

638 Engineering Reliability 3 hrs.
The 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 EG 621.

639 Selected Topics in Industrial & Systems Engineering Credit to be arranged.

641 Advanced Thermodynamics 3 hrs.
Properties of thermodynamic systems: reduced equations of state; degenerate gases, equilibrium, third law. Magnetic and electric phenomena. Prerequisite: EG 342.

645 Propulsion 3 hrs.
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.

646 Hydrodynamics 3 hrs.
Study of potential flow in two and three dimensions, potential and stream functions, vorticity; Laplace's equation, singularities and distributions of singularities, complex potential, conformal mapping; Prerequisite: EG 554 and a course in vector calculus.

649 Transport Phenomena 3 hrs.
Mass, energy, and momentum transport in steady and transient motions in real and theoretical substances. Prerequisite: EG 442.

651 Direct Conversion of Energy 3 hrs.
The analysis and study of systems for the direct conversion of heat to electricity including thermionic, magneto-hydrodynamic, fuel cells, and semiconductor devices. Prerequisite: EG 641.

652 Introduction to Air Pollution Control 3 hrs.
An introduction to the technology of air pollution dealing with air pollutants, effects, sources, combustion processes, and abatement and control technology. Engineering contributions to both the problems and its solution. Nature of the air pollution problem and fundamental technological approaches to its solution. Prerequisite: graduate standing. Offered upon demand.

654 High Speed Flow Theory 3 hrs.
Transonic, supersonic, and hypersonic flows. Topics include: compressible potential flows, perturbation methods, similarity rules, characteristics, chemically reacting flows, and the blunt body problem. Prerequisite: EG 545.

656 Viscous Flow and Convective Heat Transfer I 3 hrs.
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.

659 Selected Topics in Mechanical Engineering Credit to be arranged.

660 Theory of Vibrations 3 hrs.
Matrix treatment of systems with many degrees of freedom. Vibrations of elastic bodies. Nonlinear vibration of systems with single degree of freedom. Prerequisite: EG 561 or 563.
Advanced Dynamics 3 hrs.
Variational methods, optimization, and dynamic stability. Lagrangian and Hamiltonian formulation for dynamical systems and Hamilton-Jacobi theory. Prerequisite: EG 563.

Astrodynamics 3 hrs.
Introduction to astronomical coordinates and time systems; the many-body problems and disturbing functions. Study of general perturbation theories, special perturbation methods and application of classical mechanics and Hamilton-Jacobi methods to orbital mechanics. Prerequisite: EG 563.

Mechanics of Deformable Solids 3 hrs.
The fundamentals of solid mechanics with applications to important structural problems. Topics include: the concepts and analysis of strain and stress, the constitutive equations of elastic, plastic, and viscoelastic materials, energy and stability concepts and applications to beams and plane problems. Prerequisite: EG 273, 692.

Theory of Elasticity 3 hrs.
Review of fundamentals. Formulation of the boundary-value problems of classical elasticity. Application to plane problems, prismatic members and axisymmetric problems. Prerequisite: EG 671.

Inelastic Behavior of Materials and Structures 3 hrs.
An introduction to the 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.

Experimental Stress Analysis 3 hrs.
Experimental methods used 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.

Operating Systems 3 hrs.
Techniques of constructing operating system control programs including management of system, jobs, and data; multiprogramming, multiprocessing, and time-sharing systems. Prerequisites: EG 511 or 513. Same as CS 690.

Graduate Engineering Analysis I 3 hrs.
Linear algebra, linear transformations and matrices, vector analysis and introduction to tensors; selected applications. Prerequisite: MA 244.

Graduate Engineering Analysis II 3 hrs.
Partial differential equations, integral equations, applications and approximation. Prerequisite: MA 352.

Graduate Seminar I 1 hr.
Preparation and presentation of papers on current topics of research and general interest in engineering. To be taken no later than the term preceding registration for the 13th hour of the student’s program and no earlier than the term in which the student is registered for the 7th hour of his graduate program.

Master’s Thesis 3 or 6 hrs.
Required each term a student is working and receiving direction on his master’s thesis. A minimum of two terms and 6 hours required for M.S. students. A maximum of 9 hours of credit is awarded upon successful completion of the 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 619.

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 415 or 502.

703 Theory of Programming Languages 3 hrs.
Syntactic analysis and semantic interpretation of formal languages and the associated compiler techniques as utilized in current procedure oriented compilers. Prerequisite: CS 603. Same as CS 703.

704 Nonlinear Control Systems 3 hrs.
Classical and modern methods for the analysis and design of nonlinear automatic control systems. State variables, phase plane, limit cycles, stability, describing functions, relay control, stabilization theory. Prerequisite: EG 619.

705 Theory of Optimal Control 3 hrs.
The general theory of optimal control of dynamic processes. Calculus of variations, Hamilton-Jacobi theory, Pontryagin’s maximum principle, dynamic programming. Prerequisite: EG 619 or approval of instructor.

706 Communication Systems 3 hrs.

710 Selected Topics in Electrical Engineering Credit to be arranged.

719 Advanced Electromagnetic Field Theory 3 hrs.
A study in depth of the 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.
An extension of the applications of parametric and non-parametric methods in Cluster Analysis, Discriminant Analysis, Factor Analysis, and Pattern Recognition for the discovery of system structure and function. Prerequisite: EG 633.

729 Nonlinear Programming 3 hrs.
A presentation of optimal seeking algorithms in nonlinear mathematics including the algorithms of Theil and Van de Pann, Beal, Wolfe, Rosen, Houthakker, and Zoutendijk’s methods of feasible directions. Prerequisite: EG 196, 629.

735 Discrete Optimization 3 hrs.
A study of optimal seeking methods in discrete solution space. Topics include integer and zero-one programming, cutting-plane techniques, implicit enumeration, surrogate and aggregated constraints, and deployment methods. Prerequisite: EG 196, 635.

739 Selected Topics in Industrial and Systems Engineering Credit to be arranged.
741 Statistical Thermodynamics

747 Advanced Heat Transfer

752 Mechanics of Rarefield Gases
Study and application of kinetic theory to rarefield gas flow problems. Boltzmann statistical distribution; gas surface interaction; transport properties; free molecule flow; near free molecule flow; procedures for non-equilibrium flows. Prerequisite: EG 554. Offered upon demand.

753 Magneto-Gas Dynamics
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 545.

756 Viscous Flow and Convective Heat Transfer II
Boundary layers in compressible flow; adiabatic, heated, and cooled walls; aerodynamic heating; shock-wave boundary layer interactions. Prerequisite: EG 545, 656.

757 Turbulence
Study of 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
Development of 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
A study of the dynamics of continuous elastic bodies. The properties of wave motion are considered while studying the motion of an elastic string. Propagation of elastic waves in infinite and semi-infinite bodies, cylinders, rods, and beams. Prerequisite: EG 660.

768 Dynamics of Aerospace Vehicles
Advanced problems in aerospace vehicle rigid body dynamics and control are studied. Statistical characteristics of vehicle responses to turbulence, trajectory computations, Euler’s equations of motion for spinning vehicles, and other special problems related to satellite stabilization and control are presented. Prerequisite: EG 661.

770 Discrete Models for Nonlinear Continua
Methods for approximating continuous systems by finite systems. Particular attention is given to the finite-element approximation of continuous media. Prerequisite: EG 572, 671

772 Theory of Structural Stability
The energy criterion for the stability of an elastic structure under conservative loading. The stability concept for general continuous systems. Rigorous and approximate methods of analysis, Buckling of structural elements under impulsive and nonconservative loading. Post-buckling behavior. Prerequisite: EG 671. Offered upon demand.
Theory of Shells
The first-approximation theory of thin shells, higher approximations and transverse-shear deformations; geometrical nonlinearities and shell instability. Theories are illustrated by selected problems. Prerequisite: EG 671.

Graduate Seminar II
Preparation and presentation of papers on topics of research interest related to thesis study. Parallel to EG 699.

Doctoral Dissertation
3 or 6 hrs.
School of Nursing

Dean: Dr. Kathryn Crossland, Professor; Chairman, Lower Division: Mrs. Ruth C. Merrill, Assistant Professor; Chairman, Upper Division: Mrs. Iona W. Sutphin, Assistant Professor

Associate Professor: Dowe; Assistant Professors: Bailey, Baur, Grube, Jones, Lloyd, Pearson, Perrin, Phillips, Rubin, Tondera, Warren; Instructors: Goss, Henze, Maines, Walker, Williamson, Wright

The graduate of The University of Alabama in Huntsville School of Nursing is prepared to assume responsible citizenship and satisfying personal relationships, as well as professional nursing leadership and practice in a setting of his choice. Through a planned system of advisement, the student may develop a minor field or a secondary area of concentration in nursing. An advisor will be assigned to each student to help guide him throughout the program. Students are urged to see their advisors at least once each term for approval of program. Some courses offered for credit in other departments may not carry credit applicable to the degree in nursing.

The acceleration of social and technological change in society at large is reflected in changing patterns of nursing practice. Thus a theoretically oriented curriculum has been designed to meet the individual's goals, to prepare him to practice nursing now and in the future, and to progress to advanced study in either professional or academic graduate programs. It is believed that the student who learns to select scientific facts and theories from relevant disciplines for application to nursing practice will be able to adapt readily to changing modalities of nursing and medical practice.

A flexible program of studies encourages and provides for the student preparing to enter his first career; and, also for the mature person seeking career change or upward mobility. The student transferring into the program in nursing has the same options of testing for credit or advanced standing as any other university student (see Admissions Information). Only currently registered nurses will be permitted to challenge the required nursing courses: NUR 381, 382, 383, 481, 482, 441, 443.
Senior courses may be challenged only with permission of the Dean. Credit for at least one-half of the major nursing courses must be taken at UAH to complete requirements for the Bachelor of Science in Nursing degree.

Health Service

The unique clinical experiences of students in the nursing major requires a health surveillance program which is not applicable to other students in the University. The protection of their own health as well as that of their patients obligates the following:

1. Health examination by a medical physician within six weeks prior to beginning the junior and senior years of study. The results of such examination, including chest x-rays, must be submitted on forms provided by the School of Nursing prior to any hospital or other clinical experience.

2. Hospitalization insurance which will cover cost of ambulatory or out-patient treatment. The hospitals and health agencies are not responsible to care for illness or injury occurring while the student is practicing there.

Program of Studies

Lower Division

<table>
<thead>
<tr>
<th>Natural Science and Mathematics:</th>
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</thead>
<tbody>
<tr>
<td>Natural Science (Biology, Chemistry, Physics)</td>
</tr>
<tr>
<td>Human Ecology (Physiology, Microbiology, Epidemiology, Immunology)</td>
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<tr>
<td>Statistical Concepts (A statistics course offered in any division will meet this requirement.)</td>
</tr>
<tr>
<td>Mathematics, Freshman Level (or Level II placement)</td>
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</tbody>
</table>

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<tr>
<th>Social and Behavioral Sciences:</th>
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<tbody>
<tr>
<td>Sociology and Psychology (Two courses in one of the fields and one course in the other field.)</td>
</tr>
<tr>
<td>Electives</td>
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<tr>
<td>Humanities:</td>
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| English Composition | 6 |
| Literature or History (Two courses in sequence) | 6 |
| Electives | 18 |
Upper Division

Semester Hours

Nursing:

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<tr>
<th>Course</th>
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<td>Bases of Nursing Practice</td>
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<tr>
<td>Episodic Nursing</td>
<td>8</td>
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<tr>
<td>Distributive Nursing</td>
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<tr>
<td>Nursing Roles in Delivery of Health Services</td>
<td>4</td>
</tr>
<tr>
<td>Independent Study</td>
<td>4</td>
</tr>
</tbody>
</table>

| Electives                                   | 18    |

Summary

A total of 128 semester hours of credit is required for the B.S.N. degree. Forty-eight semester hours of nursing in the upper division as specified in the Program of Studies constitutes the major area of concentration. Each student is guided by his assigned nursing faculty advisor to select a secondary area of concentration which is consistent with the student’s goals and abilities. The secondary area requires 18 semester hours, of which 6 hours must be in the upper division. The secondary area of concentration may be in a single department or consist of a sequentially developed cluster of related courses supporting nursing practice. A minimum of 60 hours of the required courses must be completed in the lower division before progressing into major courses in the upper division.

Nursing (NUR)

331 Nursing Care of the Person with a Long-term Illness 3 hrs.
A study of the effects of long-term illness on the growth, development, and adjustment of a person and his family. Focus is placed on family-centered nursing intervention, emphasizing the best possible adjustment to alterations in family life style, and promoting high level wellness within the family. Elective. Prerequisite: NUR 381.

332 Nursing Care of Persons Experiencing Surgical Interventions 3 hrs.
A study of the effect of surgical intervention on the growth and development of the person and the subsequent adjustment of himself and his family. Focus will be on family centered nursing intervention prior to, during and after surgery. Emphasis will be on promoting the highest level of rehabilitation possible for the individual and his family. Elective. Prerequisite: NUR 381 and permission of instructor.

334 Death and Dying 3 hrs.
A consideration of death and dying in present time. Influences upon man’s current attitudes and thinking gleaned from historical, cultural, philosophical and scientific perspectives. Focus will be placed on helping the individual student recognize intimate reactions and beliefs concerning death and identifying coping resources. Elective.
Bases of Nursing Practice, I
Builds upon natural and behavioral sciences to explore theories of man's adaptive responses to threats to his health. The hospital setting provides experiences for beginning analysis and practice of communicative and motor-manipulative skills.

Bases of Nursing Practice, II
Focuses upon critical employment of the nursing process in individualized, personalized care of patients in a variety of settings which includes family health.

Bases of Nursing Practice, III
Physio-psycho-socio-pathological-assaults to man's integrity considered using patients as exemplars. Primary, secondary, and tertiary health care analyzed and utilized as nursing intervention.

Independent Study
Individualized independent study of a specific nursing problem under the sponsorship of a nursing faculty member with special preparation in the field. Elective only.

Nursing Assessment of the Client's Health
Expands the role of the nurse by increasing depth in understanding and utilizing the skills of assessment in developing a nursing history and performing a nursing assessment of the health of selected clients. Elective. Prerequisite: NUR 383 or current registered nurse license to practice in Alabama.

Nursing Care of Patients with Cardiovascular Problems
Provides an opportunity for in-depth study of patients with cardiovascular problems as selected by the student, and clinical application of the nursing process in supplying the recipient's nursing needs relative to cardiovascular conditions. Clinical agencies provide the student an opportunity to increase clinical competencies in the provision of health care to patients with cardiovascular assaults. Elective. Prerequisites: NUR 481 and 482.

Clinical Psychiatric Nursing
This course provides an opportunity for in-depth study of patients with emotional problems selected by the student and instructor. It supplements and expands experiences gained by NUR 481 by providing clinical applications as well as expansion of the theoretic base of psychiatric nursing. Elective. Prequisites: NUR 481 and 482.

Independent Study
Student initiated, faculty guided experience or research to support selected functional role. NUR 443 is prerequisite or may be concurrent.

Nursing Roles in Delivery of Health Services
Nursing roles and functions in systems of delivery of health services. A study of existing and emerging systems; emphasis on creating new approaches on basis of systems and organizational theories. Preceptorship included.

Episodic Nursing
Nursing patients with complex medical, surgical and psychiatric conditions requiring episodes of hospitalization.

Distributive Nursing
Family focused nursing care in homes, ambulatory centers and health agencies with emphasis on maternal, child, and mental health situations.
Courses in bibliography are offered as elective only, neither forming nor contributing to a cluster; nor do they contribute to the certification requirements for teacher-librarians. No credit toward the General Education Requirements is obtained.

Bibliography (BIB)

100 Introduction to Libraries and Bibliography 2 hrs.
Systems of library retrieval and their use; construction of bibliographies and footnotes; major reference materials and library resources of the area in various subjects.

310 Bibliography of British and American Philology 1 hr.
Origin and terminology of the subject; its production and utilization of information; its reference and research materials.

318 Bibliography of Romanic Philology 1 hr.
Origin and terminology of the subject; its production and utilization of information; its reference and research materials.

320 Bibliography of American History 1 hr.
Origin and terminology of the subject; its production and utilization of information; its reference and research materials.

345 Bibliography of the Health Sciences 1 hr.
Origin and terminology of the subject; its production and utilization of information; its reference and research materials.

360 Bibliography of Behavioral Science 1 hr.
Origin and terminology of the subject; its production and utilization of information; its reference and research materials.

380 Bibliography of Music 1 hr.
Origin and terminology of the subject; its production and utilization of information; its reference and research materials. Alternate years.

385 Bibliography of Art 1 hr.
Origin and terminology of the subject; its production and utilization of information; its reference and research materials. Alternate years.
Theory of Bibliographical Order

General structures of systems of bibliographical order: hierarchical trees, "alphabetical" files, juxtaposition and sydnesis, facet analysis, thesauri. Prerequisite: BIB 100 or admission to an MLS program.
School of Primary Medical Care

Dean: G. Gayle Stephens, Professor of Family Medicine; Chairman, Department of Family Medicine, The University of Alabama System Medical Education Program

Associate Dean: Silas W. Grant, Professor of Family Medicine

Assistant Dean for Program Development and Evaluation: Robert E. Froelich, Professor of Psychiatry and Chairman for Psychiatry Programs

Director of Family Practice Residency: Richard A. Brown

Assistant Director and Hospital Coordinator of Family Practice Residency: Charles T. Moss, Jr.

Administrative Science
Clinical Faculty: Ferranti, Johnson

Aerospace Medicine — Occupational Medicine
Clinical Faculty: Figarola, Tadros

Allied Health
Adjunct Instructors: B. Campbell, Kohr

Anesthesiology
Clinical Faculty: Berg, Mosley

Behavioral Medicine
Associate Professor: J. H. Campbell

Clinical Psychology
Clinical Faculty: Rinn

Community Medicine and Public Health
Professor: Bishop (chairman); Clinical Faculty: Gay, Vaughan
Dermatology
Associate Professor: Clabaugh; Clinical Faculty: Ennis, Holliman

Developmental Learning
Assistant Professor, School of Humanities and Behavioral Sciences: Fleming

ENT – Otolaryngology
Clinical Faculty: Maxwell

Family Medicine
Professors: Grant, Stephens; Associate Professor: H. T. Smith (chairman); Assistant Professors: Brown, Moss; Visiting Instructor: Dowd;
Clinical Faculty: H. Anderson, Sr., Baker, Basore, Boggess, Cauthen, Ditoro, Frierson, Gray, Grote, Kates, Kinzer, Martinec, B. H. Moore, Pewitt, Rhyne, J. Rice, Richardson, Robertson, Rowe, Rutledge, Sammons, Striplin, Thompson, Williams

Internal Medicine
Professor: Sparks (chairman); Assistant Professor (P/T): Huber;
Clinical Faculty: H. Anderson, Jr., Arrington, Battersby, Boon, Cowart, Feldman, Finch, Greenwald, Jackson, Knox, Marcus, Rogers, Watson

Medical Microbiology
Clinical Faculty: Sloyer

Medical Sociology
Professor: McCalister

Neurology
Clinical Faculty: Boyer, Plott

Neurosurgery
Clinical Faculty: Bell, Haws, Maccubbin

Obstetrics and Gynecology
Assistant Professor (P/T): Willice, (chairman);
Clinical Faculty: Alison, Bramm, Bryan, Cameron, Crowson, Goldstein, Owen, Reece, Reynolds, R. Rice, A. H. Smith, Warren, Wells, Wheeler

Ophthalmology
Clinical Faculty: Maynor, R. S. Moorman

Orthopedics
Clinical Faculty: Beck, Black, Horn

Pastoral Care
Lecturer: Pritchett
Pathology
Assistant Professor (P/T): Litkenhous (chairman);
Clinical Faculty: Butler, Flake, Lampert, B.S. Moore

Pediatrics
Assistant Professors: Lester (P/T) (Acting Chairman), Quirante, Ray (P/T);
Lecturer: Stewart;
Clinical Faculty: Bordenca, Eich, Eisenfeld, Hale, Howie, Lamon, McGehee, Meigs,
Peeler, Ploussard, Sutherland (allergy), Upchurch, Wood, Wouters

Plastic Surgery
Clinical Faculty: Burlison, G. Walker

Psychiatry
Professor: Froelich (chairman);
Lecturer: Ritchey;
Clinical Faculty: Abele, Goodson, Liddon, Wicks

Radiology
Assistant Professor (P/T): Ray (chairman);
Clinical Faculty: Booher, Bryson, Camp, J. E. Campbell, Gibson, Hewett,
McCormick, Young

Surgery
Assistant Professor (P/T): Laughlin (chairman);
Clinical Faculty: Akin, Carlisle, Cotter, Feltis, Kakani, Selah, F. Smith, W. Walker,
Whitley, Wright, Yu (thoracic and cardiovascular)

Urology
Clinical Faculty: Carter

The Clinical Faculty is drawn from practicing physicians and other active health
professionals in North Alabama.

The UAH School of Primary Medical Care is a community-based clinical school of
medicine organized by authority of the State of Alabama to serve as a key
component in a statewide plan for medical education. Under this plan, The
University of Alabama in Huntsville, The University of Alabama in Birmingham,
and The University of Alabama, University (Tuscaloosa), the three universities that
make up the University of Alabama System, have entered into a joint agreement to
educate a variety of health professionals.

Under the present University of Alabama System plan, freshman medical students
are admitted to the Medical Center at Birmingham, where they take their Phase I
(Correlated Basic Medical Science) training. Students may take their Core Clinical
Experience (Phase II) and portions of their Individualized Experience (Phase III) at
the Huntsville and Tuscaloosa campuses. All students who satisfactorily complete
their course work in The University of Alabama System Medical Education Program
at any or all of the Program's three component campuses (Birmingham, Huntsville,
Tuscaloosa) are awarded diplomas from The University of Alabama School of
Medicine.
UAH received its first undergraduate medical students participating in Phase III clinical elective offerings during the 1973 Fall Term. The first full-time medical students to matriculate at UAH began their Phase II clinical experience in Huntsville during the 1974 Fall Term as members of the Class of 1976 of The University of Alabama School of Medicine.

Correspondence pertaining to admission to the tri-campus University of Alabama System Medical Education Program should be addressed to: Director of Admissions, School of Medicine, University of Alabama in Birmingham, 1600 8th Avenue South, University Station, Birmingham, Alabama 35294. Students or prospective students at UAH who are interested in Pre-Medical or Pre-Dental baccalaureate programs are referred to the pre-professional advisor in the School of Science and Engineering through the office of the Dean of the School of Science and Engineering.

The University of Alabama in Huntsville's medical program concentrates its efforts on primary medical care. Its residency program in family practice was approved by the American Medical Association in May of 1973 and received its first resident in November, 1973. As of January, 1975, the program has five second-year and four first-year residents and will be adding more residents regularly and rapidly. In addition to family practice, UAH expects to develop residency programs in other specialties that have a major concern with primary care.

Objectives

A major premise of the School is that all medical students require basic experience in primary patient care regardless of their choice of professional specialties.

Primary care is understood to include the following essential features: personal health care of unselected patients on a continuing basis; emphasis on interviewing skills, both diagnostic and therapeutic; accurate observation and physical assessments of infants, children, and adults; appropriate use of consultation and referral; appropriate use of all health resources in the community; capacity to work effectively with, and to appreciate the contributions of co-professionals and allied health personnel; technical emphasis in the recognition of the management of the conditions most commonly encountered in the population at large (especially, early or undifferentiated states of ill health or both chronic and degenerative conditions, conditions growing out of or heavily contributed to by psychosocial and cultural factors, emergency and life-saving skills, elements of all clinical disciplines that can be safely applied to a majority of patients in ambulatory or hospital settings); managerial and administrative skills; importance of health education and techniques for providing this in a practice situation; supportive relationships with patients and their families who require unusually complex, intense, or risky treatment by other specialists for uncommon or life-threatening illnesses or injuries; well-person care; skills in special conditions of importance to persons in contemporary society (drug and alcohol abuse, child-rearing and adolescent behavior); family planning, ethical dimensions of health care; care of the terminally ill and dying; management of grief, retirement and problems of aging.
In planning all its educational programs, the UAH School of Primary Medical Care makes four basic assumptions for its faculty, residents, and students:

1. The first commitment is education for clinical practice, especially those varieties most needed in the state of Alabama.

2. The commitment to education for clinical practice is a commitment to personal health care by a personal physician.

3. Clinical practice and personal health care require a definition of clinical competence that goes beyond the biomedical sciences and technology to include behavioral sciences, communicative skills, and administrative competencies.

4. The student physician at all levels of development must become a subject of education in order to develop understanding and utilization of the self as a therapeutic agent.

Programs

Student Medical Education

The two-year clinical program of the School of Primary Medical Care qualifies the students for the M.D. degree and for passing 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 will qualify a student for graduate training in disciplines having a heavy commitment to primary medical care, including but not limited to family practice, internal medicine, pediatrics, and obstetrics and gynecology. It is intended that a student completing the program will be qualified to enter any approved residency in the United States.

The Phase II and Phase III 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 the primary care emphasis of the total program.

Each student is assigned a practicing family physician as advisor for close, ongoing contact throughout his period of study in Huntsville. These volunteer physician-advisors, selected by the School of Primary Medical Care in conjunction with the local Medical Education Committee, serve as personal mentors, expeditors and sponsors to the students across their various rotations.
The Phase II core program is made up of 56 weeks of required clerkships. The time is divided as follows:

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Weeks</th>
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<tbody>
<tr>
<td>Ob/Gyn</td>
<td>8</td>
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<tr>
<td>Pediatrics</td>
<td>12</td>
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<tr>
<td>Medicine</td>
<td>12</td>
</tr>
<tr>
<td>General Surgery</td>
<td>8</td>
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<tr>
<td>Psychiatry</td>
<td>4</td>
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<tr>
<td>Specialty Surgery</td>
<td>4</td>
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<tr>
<td>Preceptorship</td>
<td>4</td>
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<tr>
<td>Required Pediatrics or Medicine Elective</td>
<td>4</td>
</tr>
</tbody>
</table>

The core clerkships, apart from emphasizing ambulatory experiences, differ from those elsewhere mainly in terms of three longitudinal elements:

1. Each student is assigned a set of patient families to be seen in his Continuity Care preceptor’s office. The student spends one-half day per week in the office practice throughout his clinical training with increasing responsibility for the coordination and delivery of comprehensive care to his families. This experience is supervised and evaluated jointly by the preceptor and medical school faculty.

2. Weekly conferences in behavioral and community medicine are held throughout Phase II. These include substantive content relating to the developmental, social psychological, sociological, and anthropological influences upon illness behavior, practitioner-patient relationships and the organization of private and public health care delivery. A formal framework for diagnostic decision making is emphasized by also focusing upon the logic of the methods, design, and interpretation of research with inputs from clinical and social epidemiology.

3. Weekly block time is reserved for psychiatry for conference or for individual or group supervision as need indicates. The longitudinal nature of this experience, in conjunction with the required four-week psychiatry clerkship, is intended to sensitize the student to himself and to the functional realities of psychological medicine in primary care.

The Phase III Electives offered by the UAH School of Primary Medical Care are characterized by:

1. In most offerings, a one-to-one faculty-student relationship;

2. Experience with both hospital and ambulatory patient care;

3. Experience in early diagnosis of illness;

4. Through private practice exposure, experience in the non-medical aspects of health care and practice that are frequently not taught in the formal curriculum.
Clinical Clerkship in Family Medicine
Family Practice Preceptorships in North Alabama
Clinical Elective in Psychiatry
Clinical Elective in Emergency Medicine
Clinical Elective in Radiology
Clinical Elective in Ophthalmology
Clinical Elective in Nephrology
Clinical Elective in Neurology
Clinical Elective in Neurological Surgery
Clinical Elective in Plastic & Reconstructive Surgery
Clinical Elective in Orthopedics
Clinical Elective in Dermatology
Clinical Elective in Anesthesiology
Clinical Elective in Pulmonary Disease
Clinical Clerkship in Aerospace Medicine
Clinical Elective in Gastroenterology
Clinical Elective in Private Pediatric Practice

During the four-week tutorial electives (HC-HQ), the student works in both hospital and office settings at the discretion of the physician-supervisor, who extends graduated responsibility for student participation in the care of private patients.

Family Practice Residency

The basic aim of the Family Practice Residency combined program of The University of Alabama in Huntsville and of Huntsville Hospital is to alleviate the urgent need for family physicians, particularly in North Alabama. The first approved Family Practice Residency in Alabama, the UAH/HH combined program has been expanding rapidly since receiving its first resident in November of 1973. While the residents are based primarily at the UAH/HH Family Practice Center and at Huntsville Hospital, a 456-bed facility, the Family Practice Residency augments and draws upon the health resources not only of Madison County, but of towns of varying sizes throughout North Alabama.

The largest hospital in North Alabama, Huntsville Hospital is a non-profit, city-owned institution with sophisticated, systems-oriented management and a diversified medical staff. Because of its capacity and specialized facilities, Huntsville Hospital serves as a regional health care center for North Alabama and South Tennessee. The High Risk Nursery, one of these regional services, is directed by a neonatologist who is a full-time member of the pediatrics faculty at the UAH School of Primary Medical Care.

The UAH/HH Family Practice Center, located in the UAH Ambulatory Care Center across the street from Huntsville Hospital, provides residents with experience in continuity of care of members of families individually and in relation to each other. The patient population of this model family practice unit is self-generated and represents a full socio-economic spectrum.
During the first year of his residency, the UAH/HH resident in family practice gradually develops a clinical practice at the Family Practice Center as well as serving in hospital-based rotations in internal medicine, pediatrics and the nurseries, surgery and anesthesiology, gynecology and obstetrics, and emergency medicine. The second year and half of the third are centered around the resident practicing as a full partner in the family medicine group at the Family Practice Center. This ongoing and expanding participation provides in-depth experience in all aspects of continuing comprehensive care.

Patients of the Family Practice Center are admitted to Huntsville Hospital subject to the same conditions and policies that apply to admissions for any other family physician. Residents admit their patients under the supervision of an appropriate faculty physician. Consultation and referral are the prerogative of the resident and his faculty supervisor.

The resident’s secondary responsibilities in his second year and half of his third are in subspecialty disciplines, psychotherapy, community medicine, teaching and/or research. The residency has been organized to provide both inpatient and outpatient experience in a variety of organizational and geographic settings. The growing exchange of skills and services between the School of Primary Medical Care and the region it serves makes possible the integration into the UAH Family Practice Residency of experiences in such diverse areas as nursing homes, industrial medical systems, small-town doctors’ offices, and urban community health organizations.

The UAH/HH Family Practice Residency program has several distinctive characteristics:

1. The resident is an employee of The University of Alabama in Huntsville. As an employee of a regional university rather than a specific hospital, the UAH/HH family practice resident is a natural extension of the University’s cooperative endeavors with the citizens and health professionals throughout North Alabama; he also enjoys benefits as a member of the UAH faculty or staff.

2. The family practice resident not only represents The University of Alabama in Huntsville as one of its professional staff; his residency training is integrated into the larger academic life of the University. During the second and third year of the residency, the resident is expected and encouraged to incorporate into his program a total of four quarterly (10 week) graduate level or continuous education courses at UAH in academic fields related to family medicine and health-care delivery. These courses may be selected from an approved list in the behavioral sciences, administrative sciences, developmental learning, computer science, political science, history, or philosophy and ethics.
Courses in these related non-medical disciplines have some pragmatic medical goals:

a. Knowledge of the interrelationship of biological, psychological, sociological, and cultural variables in the health of an individual;

b. Understanding of the philosophic and moral dimensions of health;

c. Ability to maintain a professional therapeutic relationship with large numbers of patients representing a broad spectrum of personality types, behaviors, and clinical problems;

d. Understanding of family structure and function;

e. Skill at practice organization and management, including the creation of a viable health care team and the application of technology to the administrative and business aspects of practice.

3. Implicit in these goals and in the interdisciplinary approach they represent is emphasis on the doctor-patient relationship as crucial to comprehensive health maintenance. The UAH family practice resident is expected to develop his communicative skills, including counseling and psychotherapy and effective methods of history-taking and record-keeping.

4. A family practice preceptorship in a rural area or small town in North Alabama is built into the third or second year of the residency.

5. A resident may elect to earn a master’s degree in Administrative Science or Developmental Learning during the three years of the residency, and the total schedule will be modified to accommodate this activity.

Half of the third year is set aside for an individual program specifically designed to prepare the resident for the kind of practice in which he plans to participate. The UAH Family Practice Residency is planned to encourage individual initiative in structuring programs to suit the resident’s interests and needs while developing those skills that will meet the description by the American Academy of Family Physicians:

"The family physician is a physician who practices in the discipline of family medicine whose training and experience qualify him to practice in several fields of medicine and surgery, with particular emphasis on the family unit, who:

a. Serves the public as the physician of first contact and means of entry into the health care system;

b. Evaluates his patient’s total health needs, providing personal medical care within one or more fields of medicine, and refers the patient when indicated to appropriate sources of care while preserving the continuity of his care;

c. Assumes responsibility for his patient’s comprehensive and continuing health care and acts as coordinator of his patient’s health services; and
d. Accepts responsibility for his patient's total health care, including the use of consultants, within the context of their environment, including the community and the family or comparable social unit."

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 heavily on the active cooperation of the hospitals and medical professionals of North Alabama. The quality of medical facilities and personnel in this area was one of the basic reasons for locating the School of Primary Medical Care at The University of Alabama in Huntsville. University departments, representing the humanities and behavioral sciences, computer sciences, engineering, and business administration, constitute resources for the creation of an interdisciplinary curriculum that is particularly relevant to the needs of primary health-care education and delivery.

Medical facilities are in service both on the UAH campus and in the Huntsville medical district. A University Health Center has been established on campus as a setting for ambulatory care services and education. The Family Practice Center, one of the basic teaching elements of the School of Primary Medical Care, located in the medical school Ambulatory Care Center across Governors Drive from Huntsville Hospital. This model family practice unit provides residents and students with essential clinical experience in treating urban, small-town, and rural patients from throughout North Alabama — the sort of wide-ranging random variety of problems and personalities the physician offering primary health services will encounter. The governing board and administration of Huntsville Hospital have played a crucial role in co-sponsoring the Family Practice Center with UAH and in planning for the participation in the care of hospitalized patients by medical students and residents.

The Family Practice Center and all aspects of the education of physicians through the new medical school in Huntsville are part of the services provided by The University of Alabama in Huntsville to the region and the state. The School of Primary Medical Care is one of a new breed of medical schools that are organically integrated into the life of their communities, drawing on existing facilities and professional personnel and, in return, expanding and diversifying the health services available. This kind of mutually beneficial partnership is in accord with the primary medical care concept that considers both patient and doctor as unique individuals who cannot be understood apart from the other individuals with whom they work and live.
Dean: J. E. Rush, Jr., Associate Professor of Physics

The graduate programs of The University of Alabama in Huntsville provide a learning experience in which the student further develops his intellectual capabilities through advanced studies. These studies are characterized by a greater degree of independence on the part of 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 Graduate School. The student must assume full responsibility for acquainting himself with all requirements related to a desired program and for fulfilling these requirements.

The graduate degree is based on a program of studies designed to accomplish a specific intellectual or professional goal. This program of studies should be planned by the student at the earliest appropriate time (see specific degree programs) with the counsel of his faculty advisor. The program includes advanced studies in subject matter areas, and in most cases a research phase in which the student demonstrates his capabilities for independent scholarly work.

The University of Alabama in Huntsville offers the following graduate degrees:

Master of Administrative Science (MAS)
Master of Arts (MA) — Developmental Learning, English, Mathematics
Master of Science (MS) — Chemistry, Physics
Master of Science in Engineering (MSE)
Master of Science in Operations Research (MSOR)
Doctor of Philosophy (PhD) — Engineering, Physics

A limited schedule of graduate courses in education is offered also.

A person who desires to obtain graduate credits without pursuing one of the degree programs may be admitted as an unclassified student provided that he meets the qualifications outlined below for regular admission.
A person previously admitted to The University of Alabama in Huntsville Graduate School to pursue a degree program offered in one department must meet current admission criteria if he wishes to change his course of study to a degree program offered in another department. (See application procedure.)

Irregular Post Graduate Status

Persons whose applications to the Graduate School have been denied on the basis of a quality point average and/or GRE score may apply to UAH for admission with irregular post graduate status. (See Admission as an IPG in the undergraduate section of this catalog.) A student admitted in this category may register in courses at UAH provided that all prerequisites for the courses have been satisfactorily completed.

Upon completion of 12 or more semester hours of advanced level courses with a grade of B or better in each course, a student may reapply for admission to the Graduate School. Evaluation of his 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.

UAH Seniors

A UAH senior may, with permission of the Graduate Dean, pursue graduate work while completing undergraduate degree requirements if:
1. Fewer than 13 semester hours remain to be taken.
2. His overall undergraduate average or his average on the last 60 hours is at least 2.0 (B).
3. His total course load is less than 12 semester hours.

Application Procedure

Applicant must submit:
1. Completed graduate application form in duplicate.
2. Non-refundable application fee of $15.

In addition he must request that:
1. Two copies of previous academic records be sent from each collegiate institution attended to UAH Admissions and Records Office.
2. Scores of the Graduate Record Examination (GRE) be sent to UAH Admissions and Records Office from Educational Testing Service (ETS).

Applicants to a PhD program who have been previously admitted to the Graduate School of The University of Alabama in Huntsville must submit a completed re-evaluation form to the UAH Admissions and Records Office.

Members of the University faculty with rank above that of instructor may not pursue work toward an advanced degree at The University of Alabama in Huntsville.

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Requirements For Admission

Applicants for admission to the Graduate School must hold a bachelor's degree from The University of Alabama in Huntsville or from another approved institution. The following minimum requirements are acceptable to the Graduate Faculty; academic units may require higher averages. (See admission requirements listed under the school concerned.)

Admission

An applicant must:
1. Have a minimum quality point average of at least 2.0 (A=3.0) overall, or at least 2.0 for the last 60 hours of work, and
2. Score at least 1,000 on the aptitude portion of the Graduate Record Examination (GRE). The advanced test of the GRE in the applicant's proposed graduate field is also required, unless waived by the major department. Information concerning the GRE may be obtained from Educational Testing Service (ETS), Princeton, New Jersey. Applications may be obtained at the UAH Admissions and Records Office.

Students applying for admission to Graduate School after the current application deadline date for the Graduate Record Examination may be admitted on a temporary probationary basis, based on a minimum score of 50 on the Miller Analogies Test. (Administered and graded locally.) The student so admitted must take the GRE when it is next offered and meet normal entrance requirements to continue graduate study.

Probationary Admission

An applicant whose scholastic record does not fully meet the requirements for admission may, upon recommendation of the appropriate department chairman and with the approval of the Graduate Dean, be admitted on a probationary basis provided:
1. His quality point average is at least 1.5 (A=3.0) overall (GRE also required) or
2. His score on the aptitude portion of the GRE is at least 1,000 or
3. His quality point average on the last 60 hours is at least 2.0 (GRE also required).

An applicant to a graduate degree program other than that to which he was previously admitted must submit a completed re-evaluation form to the UAH Admissions and Records Office. Such a student must meet current admission criteria if he wishes to change his course of study to a degree program offered in another division.

All application materials must be in the UAH Admissions and Records Office no later than dates specified in the UAH Calendar.
Applicants are urged to initiate actions for admission at least six weeks in advance of the registration date of the term for which admission is sought.

Registration

A student must be admitted to the Graduate School in order 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 per term. Students employed full time (40 or more clock hours per week) can schedule no more than 3 semester hours of graduate work per term without permission of their faculty advisors. If a student does not have an advisor, he must obtain approval from the departmental chairman. (A full-time teacher working toward certification is limited to one course per term and a maximum of three, 3 semester-hour courses per academic year [9 months].)

Identified undergraduate prerequisites or deficiencies should be scheduled early in the graduate program.

The same requirements and procedures of attendance, conduct, withdrawals, examinations, and assigned tasks that apply to undergraduate students must be met by graduate students.

Students working on a thesis must register for thesis.

Scholastic Requirements

The following scholastic requirements are those of the Graduate School; individual academic units may identify additional requirements.

Degree Requirements:
1. Overall grade average must be B or better on all graduate credit hours undertaken at UAH.
2. Credits toward a graduate degree are earned only with grades of C or better.
3. At least 50% of the hours required for a graduate degree must be completed in courses numbered 600 or above.

Probationary Status:
1. Students admitted on a probationary basis who have 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 assume the status of unconditionally admitted students. At any time the overall grade average of a student drops below a B average, the student will be placed on probation.
2. A student on probation cannot apply for admission to candidacy 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 in which the student was placed on probation.

4. Failure to remove probation in the manner identified in No. 3 results in dismissal from the Graduate School. In exceptional cases, a student may be readmitted upon recommendation of the faculty in his major department and approval by the Graduate Dean.

The Master's Degree

All course work is done with the approval of the faculty in the student's major department.

Plan One

Degree requirements under this plan include completion of 24 or more semester hours of course work and the writing of an acceptable thesis.

The thesis should show evidence of the student's capacity for research and independent thought, as well as his ability to interpret materials used and to write in clear, acceptable English. The subject must be in the major field and must be approved by a faculty committee of the major field, by the chairman of the appropriate department, and by the Graduate Dean.

A completed copy of the thesis must be submitted to the major division at least four weeks before the date on which the candidate expects to receive the degree. At least ten days before graduation three copies of the thesis, approved by the thesis committee and the dean of the major school, and a receipt for the binding fee ($13.00) must be deposited in the UAH Admissions and Records Office. Theses must comply with the regulations set out in the leaflet *Instruction for the Preparation of Theses and Dissertations at The University of Alabama in Huntsville* which is available at the UAH Admissions and Records Office. Approval by the Graduate Dean or his designated representative is necessary before graduation.

In exceptional cases, theses may be written in absentia. To obtain permission for such action, the student, before leaving the University, must select his thesis subject and submit to the director of his major department a satisfactory outline of his thesis, plus satisfactory evidence that adequate facilities are available where he plans to do his work.

Plan Two

Degree requirements for the master's degree under this plan include the completion of 33 or more semester hours of course work. If the program contains three or more terms of full-time work (6 to 10 semester hours per term), the degree requirements may be met with 30 or more semester hours of course work. A thesis is not required.
A candidate working under Plan Two may be required to participate successfully in seminar or problem courses that will give him an acquaintance with the methods of research and an appreciation of the place and function of original investigation in the field.

Transferred Credit

With the permission of his major department, a student may transfer a maximum of six semester hours of acceptable graduate credit, earned in an approved institution, and may count it toward a master’s degree. He may also petition his major department to recommend to the Graduate Dean that six 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 transferrable only if the student was enrolled in a graduate school at the time it was taken and if his overall average at the institution was B or better. Students who have graduate credits from other units of the University of Alabama must complete a minimum of 12 semester hours at UAH to receive a master’s degree from UAH.

Admission to Candidacy

Admission to the Graduate School and admission to candidacy for a degree are two separate acts. Application for admission to candidacy for the master’s degree should be filed after the completion of 12 semester hours but before the completion of 18 semester hours of graduate credit at The University of Alabama in Huntsville. It must be approved at least two months before the degree is conferred. Approval will depend on (a) the quality of the applicant’s graduate work prior to the time the application is made (see Scholastic Requirements); (b) the removal of any special conditions; and (c) the certification of the major department that the student is well qualified to continue work toward the degree. Application forms will be supplied by the UAH Admissions and Records Office.

Time Limit

All requirements for the master’s degree should be completed in not more than six years. Credit for individual courses completed at The University of Alabama in Huntsville more than six years but less than ten years before the completion of all requirements for the degree may be validated by special examination given by the department concerned. Such an examination will be equivalent to a final examination in the course.

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 is given, there will be an oral examination which may be limited to the thesis. The candidate will be examined on his major subject or subjects and his thesis if he pursues Plan One, and on his field or fields of concentration if he pursues Plan Two. The oral examination is conducted by a committee of at least 3 members, appointed by the Graduate Dean. A written notice of the time and place of the examination is sent by the Graduate Dean to the candidate and to 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 on furnished forms. 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 UAH Admissions and Records Office 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, arrived at by the student and his faculty committee in concert, including course work requirements, mastery of certain tool skills (languages, computer programming, statistics, and others approved by the Graduate Council) as appropriate, and culminating in 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 PhD degree programs within the University. Additional requirements may be imposed by individual departments. Information concerning the Doctor of Philosophy programs in engineering and in physics may be obtained from the School of Science and Engineering or from the appropriate department.

Application Procedure

Students applying for admission to the Graduate School should follow the procedure on page 229. Graduate students who wish to work toward the PhD must be admitted to a PhD program.

Course Requirements

The Graduate School imposes no specific course or credit-hour requirements for the PhD. Course requirements are defined in the program of study and are determined by the appropriate department. Usually the student will take a majority of his courses in a given field and the remainder in a cognate field; however, this is not a requirement.
The approval of the program of study should be accomplished as early as possible, usually no later than the end of the first year of study. The program of study is approved by the student’s department, and may be amended by the Supervisory Committee.

**Transferred Credit**

All credit toward the PhD which has not been earned at UAH must be acceptable graduate credit, transferred from an approved institution. Such credit is transferred only with the 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 provided by the Educational Testing Service 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 E.T.S. Graduate School Foreign Language Test at a level appropriately higher than that for no. 1 above; or

4. Competency in two independent ancillary areas (independent of each other), proficiency in which is to be demonstrated to the satisfaction of the department of the major.

**Residence Requirements**

Residence at UAH as a graduate student is required for the award of a PhD degree for two purposes:

1. the cultivation of each student’s reasoning ability and of his breadth of fundamental understanding in his field outside of his narrow thesis topic by sufficient exposure to protracted informal discussions with and criticism by his fellow students and by a variety of faculty members;

2. the evaluation of the student’s investigative abilities and his scholastic progress by faculty members other than his major advisor.

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 a minimum for satisfying the two purposes just stated. Therefore, as a general requirement, each student shall have successfully completed at least three academic years of residence beyond his bachelor’s degree; at least one of the three academic years shall have been spent in continuous full-time residence. Each department which offers a PhD program may require additional residence and will define these additions and its approved equivalents in the section of the Catalog describing its PhD program. All
research effort presented for residence credit toward the PhD degree must be performed under the direction of a full member of the UAH Graduate Faculty.

Supervisory Committee

A Supervisory Committee is appointed for each student working toward the PhD usually after satisfactory completion of a preliminary examination administered by the major department. The Supervisory Committee is composed of three members from the major department and two from other departments, and is appointed by the Graduate Dean. In directing the student’s continued work toward the PhD, the Supervisory Committee will examine his research proposal for the dissertation and may require modification in the program of study to better his preparation for this research.

Qualifying Examination

The Qualifying Examination is given under the auspices of the graduate faculty, usually by the Supervisory Committee. The examination is a demonstration of proficiency in the subject matter phase of the program of study and shall be part 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. Attempts beyond two will require the permission of the Graduate Council.

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 recommendations of the student’s advisory 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 Graduate Registrar and to initiate the procedure for admission to candidacy at least six months prior to 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 a cogent, well-written exposition.

A completed copy of the dissertation 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 dissertation, approved by the student’s committee and the chairman of the major department, and a receipt for the binding fee ($13.00) must be deposited in the UAH Admissions and Records Office. Dissertations must comply with the regulations set
out in the leaflet, *Instruction for the Preparation of Theses and Dissertations at The University of Alabama in Huntsville*, which is available at the UAH Admissions and Records Office. Approval by the Graduate Dean or his designated representative is necessary before graduation.

**Final Examination**

The final examination is an oral defense of the thesis before the student's committee and is open to the members of the University community in the form of a seminar.

**Application for Degree**

Each candidate for a PhD degree must apply for the degree through the UAH Graduate School Office 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.

**Special Requirements**

Special requirements of the academic departments are indicated in the separate school sections.

Students must assume full responsibility for acquainting themselves with all requirements related to a desired program and for carrying them out.

**Cooperative Ph.D. Programs**

Close cooperation on PhD programs exists between departments on the Huntsville 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 utilization of services in Huntsville may submit application materials to the UAH Graduate School. Upon being admitted, the student will be advised of the procedures for program planning.

The minimum residence requirements on the Tuscaloosa Campus include:

1. 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

2. 18 semester hours of credits (including research, seminars, dissertation, 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 his Advisory 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.

In order 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 his Graduate Dean.

The Deans of the Graduate Schools or their representatives will serve as liaison officers in arranging programs for which the additional hours may be transferred and other details.
Division of Continuous Education

Director and Coordinator of Technical Studies: Raymond C. Watson, Jr., Associate Professor; Coordinator of Administrative Studies: Richard H. Shuford, Jr., Assistant Professor

The mission of the Division of Continuous Education is to apply university-level capabilities in meeting educational needs of persons at all age levels. This mission is fulfilled through continuing education and public service activities as well as special programs that supplement the standard offerings at UAH. The following sections describe the post-secondary instructional activities of this Division.

General Information

The Division of Continuous Education offers credit and non-credit courses, conferences, seminars, and institutes in a variety of subjects to provide for individual enrichment and professional advancement. Primarily intended for adults, these offerings are given so as to be convenient for the greatest number of intended attendees. Many classes are scheduled in the evenings and on a short-term basis. Preliminary efforts are now being made in the use of educational television and independent study. Special technical and management courses are given in facilities of industrial and governmental organizations. Working in association with the other elements of UAH, courses drawn from the standard academic programs are given in extension.

Admission and Credit

Applications for non-credit courses may be completed during registration. In general, these courses are open to all adults, but prerequisites are necessary for certain advanced courses. UAH now grants continuing education units (c.e.u.) in recognition of satisfactory completion of non-credit courses. The c.e.u. is the standard adopted by colleges and universities for offerings that do not have academic credit. Permanent c.e.u. records for students are maintained by the Continuous Education Division.
Persons desiring to have credit earned through the Continuous Education Division applied in regular academic programs should be admitted to UAH and register as regular students. However, credit may also be pursued by registering as a non-matriculated student. Credit earned in the non-matriculated category remains on file with the Continuous Education Division. If the student later is admitted as a regular student, the credit may be accepted into the regular records, subject to the standard regulations governing transfer credit. Requests for transfer of credit earned as a non-matriculated student should be submitted in writing to this division.

The application to enroll as a non-matriculated student may be completed at the time of registration. No transcripts or other credentials are required. A non-matriculated student must certify that he or she is (1) a high school graduate or has a satisfactory score on the GED, (2) has the stated prerequisites for the course desired, and (3) is not under current suspension from another institution.

Offerings Available

Some courses are given on a periodic basis, but many of the offerings are designed to meet current needs or interests. Consequently, the offerings available vary considerably with time. Brochures describing the offerings during various periods are available. Persons interested in receiving these brochures should contact the Continuous Education Division. Inquiries concerning the development of special courses are invited.

Fees

Full-term credit courses offered by the Division of Continuous Education follow the fee schedule of UAH and students may include these courses under the maximum fee structure. Short-term, off-campus, or non-credit offerings are not applicable to these fee conditions. Fees for such courses vary and are announced prior to each offering.

Associate Certificate Programs

Many individuals have a need for an organized program of study at the university level, but do not feel that the baccalaureate is a practical goal. This is particularly true for mature adults who are beginning or reentering their studies on a part-time basis. For these persons, UAH has developed associate certificate programs in selected areas. Credit earned in the associate certificate programs 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

Students in the associate certificate programs must be admitted to UAH and are subject to all of the standard academic regulations of this institution. Overall requirements for the associate certificate are as follows:
1. Complete 60 semester hours credit, including 24-26 hours in general education requirements, 30 hours in a specific curriculum of specialty and supporting courses, and the remaining hours in free electives.

2. Earn an overall average of C in (a) all courses attempted and (b) all specialty courses attempted.

Transfer students must earn at least 18 semester hours, including 6 hours in specialty courses, in classes through UAH and must complete 6 of the last 9 hours credit through this institution. In addition to the overall grade average, transfer students must earn an average grade of C in (a) all courses attempted at UAH and (b) all specialty courses attempted 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).

The general education requirements 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, 6-8 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.

Students who intend to continue their studies toward the baccalaureate are cautioned to select general education courses that will also apply toward the requirements for the higher degree. In each of the above groups, the courses marked "a" are acceptable in most bachelor's degree programs at UAH.

**Child Development**

The Associate in Child Development Certificate will be awarded upon completion of the general requirements with 30 semester hours in specialty and supporting courses as follows.

- **Specialty Courses:** CD 101 and CD 203 required; minimum of 9 hours from CD 102, CD 201, CD 202, CD 301, and CD 302

- **Supporting Courses:** SOC 100 and PY 103 required; remaining hours from ART 215, MU 215, ED 215, ED 230, ED 493, ED 495, and ED 499

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Other courses may be substituted with permission from the child development program coordinator.

**Law Enforcement**

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.

**Specialty Courses:** LE 101 required; minimum of 12 hours from LE 102, LE 201, LE 203, LE 301, LE 303, LE 304, LE 305, and LE 401

**Supporting Courses:** PSC 101, SOC 100, and PY 103 required; remaining hours from PSC 102, PSC 212, PSC 271, SOC 320, and SOC 420

Other courses may be substituted with permission from the law enforcement program coordinator.

**Interior Decoration**

The Associate in Interior Decoration Certificate will be awarded upon completion of the general requirements with 30 semester hours in specialty and supporting courses as follows.

**Specialty Courses:** ID 101, ID 102, and ID 202 required; minimum of two courses from ID 197, ID 201, and ID 309

**Supporting Courses:** ARH 101, ARH 102, and ARS 121 required; remaining hours from studio art (minimum of two ARS courses or one ARS course if ID 197 is taken) and art history (including one advanced ARH course).

Other courses may be substituted with permission from the interior decoration program coordinator.

**Basic Certificate Programs**

The basic certificate programs are primarily for persons who are not interested in pursuing an associate certificate or a bachelor's degree but desire an organized curriculum in a specialized area at the university level. The programs should be of particular interest to a person who has completed an undergraduate program of study but needs basic training in a new specialty.

Overall requirements for a basic certificate are as follows:

1. Complete 30 semester hours credit, including 3-6 hours in written and oral communications and the remaining hours in a specific curriculum of specialty and supporting courses.
2. Earn an overall average of C in (a) all courses attempted and (b) all courses attempted at UAH.

Transfer students must earn at least 12 semester hours in classes through UAH, and must complete 6 of the last 9 hours credit through this institution. Up to 15 semester hours of the total requirements for the basic 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).

Persons interested in pursuing a basic certificate should get in touch with the Division of Continuous Education concerning the specific curricula that are available or that can be developed.

Post-Graduate Certificate Program

The problems associated with obsolescence in professional personnel are reaching a critical level and must receive immediate attention if the United States is to maintain its economic and technological leadership. As a remedy to professional obsolescence, UAH offers a new type of activity: the Post-Graduate Certificate Program. Departing from tradition, this program combines some of the best features of continuing education courses and traditional, advanced study to provide fully credited, organized curricula to keep professional personnel proficient in their fields.

Admission

All participants in the program must hold at least a bachelor’s degree from an approved institution. However, quality point averages will not be a factor in determining acceptance, and the Graduate Record Examination will not be required. The field of specialization in the program will be determined by the student’s needs and will not be limited to that of his prior academic area of concentration, but prerequisites for specific courses must be met.

Normally, persons in the program will be admitted to UAH in the irregular post-graduate category. Persons with the necessary academic qualifications may desire to be admitted with the status of graduate student or graduate student on probation. Students who cannot meet deadlines for admission application may start in the program by registering as a non-matriculated student or a special student.

In addition to being admitted to UAH, each participant in the program must register with the Division of Continuous Education.

Requirements

Requirements for earning the post-graduate certificate are 15 semester hours credit in an approved curriculum of 500- level and above courses, with a quality point
average of at least 1.0 on all courses attempted. To be applicable, credit must not be more than six years old at the time of certificate completion, and at least six semester hours credit must be earned after registering for the program with the Division of Continuous Education.

Curricula

In the field of administration, programs may be selected for post-graduate certificates in the following areas:

- General Administration
- Program Management
- Contract Administration
- Industrial Administration
- Logistics Management

In technical areas, programs may be selected in the following:

- General Technology
- Sensor Systems
- Electronics Technology
- Aero-mechanical Technology
- Computer Technology

Each curriculum will include one or more core courses to establish the area of specialization; the remaining courses will be selected in accordance with individual requirements. The curriculum for each student must be approved by an advisor.

Courses may be drawn from the special 500-level offerings of the Division of Continuous Education and from the regular offerings of other departments. Offerings from the Continuous Education Division will be presented in both short-term and standard periods. Major courses will be given in both formats during each year.

Post-graduate credits earned in the University of Alabama System prior to entering the program may possibly be used in a curriculum. Up to six semester hours credit might be transferred from institutions not in the system. However, all such credit is subject to the six-year limitation and must fit into an approved curriculum.

Relationship to Standard Graduate Programs

There is an overlapping of courses appropriate for both types of programs. It may be possible for students to apply credit earned in the post-graduate certificate program to requirements for a master's or doctoral degree. For this, the course must be approved for graduate credit and the student must be fully admitted to Graduate School prior to pursuing the course. Further, the student's graduate advisory committee must approve each specific course and will control the admission of credit earned while pursuing the post-graduate certificate.
The admission requirements of the UAH Graduate School are very specific, directed toward the academically talented student. However, it is recognized that some very capable persons did not demonstrate this talent in prior studies. Such persons may be considered for admission to Graduate School after completion of 12 semester hours in advanced courses with a grade of B or better. Courses from the post-graduate certificate program may be an excellent means of pursuing this credit. Students intending to use the credit for this purpose are advised to consult with the department responsible for the desired graduate program as to the acceptability of specific courses.

Non-Credit Certificate Programs

In addition to the academic certificate programs, the Division of Continuous Education offers certificate programs based on non-credit courses. These programs are open to any adults; however, the level of instruction is directed toward persons with at least a high-school background or the equivalent.

At the present time, programs are available in Small Business Management and in Supervisory Management. Each curriculum requires four non-credit courses. Brochures describing these programs are available from the Division of Continuous Education.

Cooperative Education Programs

The Division of Continuous Education has two co-op programs that are available to a limited number of undergraduate students. The programs are designed to supplement the traditional undergraduate activities, giving the student practical experience in his or her chosen field.

Regular Co-Op Program

Participants in this program alternate periods of full-time study with career-related work. Although the program is not primarily intended as a financial aid, organizations which employ co-op students pay them for their services, thus assisting the students in defraying a part or all of their educational expenses.

Work assignments are arranged by the Co-Op Coordinator, primarily on the basis of each student's aptitude and academic potential. Although students majoring in all of the disciplines at UAH are potential candidates, most of the work positions available are for students in the fields of engineering, physical sciences, mathematics, and business.

Any person admitted to UAH as an undergraduate student is eligible to apply for the co-op program. However, before work periods may begin, a student must meet the following requirements:
1. Have a minimum of 16 semester hours credit, including at least 8 semester hours earned at UAH.
2. Have an overall average of C or better on all courses attempted at UAH.
3. Make a choice as to his or her academic area of concentration.

Training with Assistance Program

The Training with Assistance Program (TAP) is a special preliminary co-op activity directed toward upper-level high school students who are interested in engineering and related physical science fields. TAP is primarily for female and minority students.

Under TAP, a student is placed with a sponsoring industrial or governmental organization immediately upon graduation from high school, working full-time during the summer term. For the freshman year, a TAP student attends UAH full time, with tuition and certain other costs paid by the sponsoring organization. Upon satisfactory completion of the first academic year, the student transfers to the regular co-op program.

For additional information, get in touch with the Co-Op Office of the Division of Continuous Education.

Courses

The following courses are offered by the Division of Continuous Education, primarily for the Academic Certificate programs described in the previous sections. The number shown is for credit registration. All of the courses are also available as non-credit.

Child Development (CD)

101 Introduction to Child Development
   Introduction to the physical, social, emotional, and mental development of the young child; survey of the work functions, employment opportunities, and responsibilities of personnel trained in child development.

102 Child Nutrition and Health Care
   Basic information on human nutrition, the nutritional value of food, and the 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
   Introduction to art and simple science media for use with young children; principles relating to the choice, use, and value of creative media in enrichment opportunities for children.

202 Language Development
   Study of the 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.
Study of the total pattern of child development; curriculum, learning, methods, and
guidance of the child from two to nine years of age; analysis of curricula for various
types of preschool programs; introduction to basic testing and evaluating the young
child. Prerequisite: CD 101 or permission of coordinator.

301 Preschool Programs and Centers 3 hrs.
Detailed study of 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.

Interior Decoration (ID)

101 Fundamentals of Home Furnishings 3 hrs.
Introductory survey of furnishings for the home. Design terms; styles of furniture; basic
decoration methods including furniture arrangement, elements of color, window
treatment, accessories, and lighting; and customer buying of furniture, floor coverings,
fabrics, and wall coverings.

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

197 Drawing and Rendering 2 hrs.
Drawing techniques for illustration in interior decoration. Investigation in expressive and
objective drawing styles in the professional media. Free-hand sketching, perspective
studies, rendering techniques, and composition in line, form, value, and color. Same as
ARS 197.

201 Introductory Architectural Planning 3 hrs.
Survey of architectural planning and drawing, primarily as these topics relate to interior
decoration. Basic drawing and sketching; planning processes for home and light-
commercial buildings; construction materials; elements of construction methods;
introduction to preparation of architectural drawings.

202 Interior Decoration Problems 3 hrs.
Detailed study of selected problems in interior decoration. Practical applications in
combining furniture, accessories, materials, and finishes; development of a portfolio of
materials; ethics in commercial interior decoration. Prerequisite: ID 102.

309 Period Styles 3 hrs.
An illustrated survey of the historical development of period styles, European and
American, including a discussion of contemporary trends. Pertinent styles of architecture
are considered as backgrounds for related styles of furnishings. Same as ARH 309.

Law Enforcement (LE)

101 Introduction to Criminal Justice 3 hrs.
An introductory survey of the panorama of the criminal justice system. Philosophical
and historical background; constitutional limitations; criminal justice agencies; pre-trial,
trial, and post-trial processes; evaluation of criminal justice today.
102 Law Enforcement Operations
A study of the functions and relationships in line elements of law enforcement agencies. This course offered only through independent study. (Note: Persons who have successfully completed an approved police academy training program, civil or military, may be granted credit in this course for their educational experience.)

201 Investigation and Evidence
Introduction to the evidential aspects of criminal investigation. Rules of evidence; basic principles of investigation; nature and types of evidence; testimony; collecting and presenting evidence; judicial decisions. Prerequisite: LE 101 or permission of the coordinator.

203 Introduction to Criminalistics
Introductory survey of the scientific approach to criminal investigation. Definition and scope of criminalistics; physical evidence and probability; equipment for investigation; collecting physical evidence; nature of physical evidence; laboratory operations and techniques; the expert witness. Prerequisite: LE 101, introductory science desirable.

The following courses are open to students who have completed LE 101 (or the equivalent) or who have upper-division standing.

301 Crime and Delinquency
A detailed study of crime and delinquency in the United States: quantity, measurement, trends, economic impact, and victimization. Examination of the nature and impact of organized crime. Prerequisite: LE 101 or permission of instructor.

303 Criminal Law
A study of substantive criminal law. Principles of criminal law; theories of legal defenses; crimes against the person and property; offenses against public morality and decency; offenses against the sovereign, public peace, and maintenance of order.

304 Criminal Procedure
A study of the procedure that controls the judicial process in criminal cases. Nature of the criminal process; arrest, search, and seizure; interrogation and confessions; pre-trial proceedings; order and conduct of trials; review of convictions; juvenile proceedings; military criminal proceedings; constitutional rights. Prerequisite: LE 303 or equivalent.

305 Probation and Parole
An examination of procedures for the release of convicted law violators. Pre-sentence investigations; the selection, supervision, and releasing of probationers and parolees; rules and regulations; trends in treatment; effectiveness of release procedures.

401 Critical Issues in Law Enforcement
An examination of current issues that are of critical importance to law enforcement in a free society. Reading and discussion of articles and commission reports.

Modern Administration (MN)

The following courses are primarily intended for personnel working in administrative or technical management positions. Prerequisite for all of these courses is an educational background equivalent to at least two years of college-level work.

501 Decision Mathematics
Introduction to mathematical concepts used in management science: matrix algebra, linear systems, linear programming, game theory, basic calculus, set theory, probability. Prerequisite: college-level algebra.
Statistical Techniques
Introduction to the theory and application of statistical techniques in management and engineering: descriptive methods, probability and sampling theory, statistical inference. Prerequisite: college-level algebra.

Introduction to Operations Research
Introduction to the theories and applications of operations research in management and engineering: decision theory, calculus of optimization, linear programming, the transportation problem, simplex algorithms, waiting lines, simulation. Prerequisite: college-level algebra and basic knowledge of statistics.

Management Processes
Survey of modern management processes as viewed in systems terms: systems and models; the systems approach to management; planning functions; management execution in organizing, motivating, and controlling.

Decision Accounting
Study of the uses and applications of financial data in the solution of problems faced by administrators, such as product costing, profit planning, and cost systems. Primarily for non-financial managers.

Fundamentals of Program Management
Intensive survey of the principles and techniques involved in the management of technical programs.

Contract Management
Study of governmental procurement processes, nature of various types of contracts, and management of contract performance. Primarily for R&D technical and managerial personnel.

Configuration Management
Study of the needs, concepts, and applications of configuration identification, control, and status accounting as related to hardware and documentation.

Cost Modeling and Estimating
Introduction to the philosophy and methodology of managerial and engineering costing techniques. Methods of cost comparison, cost equivalence, CER development, progress functions, and simulation. Prerequisite: college-level algebra; basic statistics desirable.

Planning and Control Techniques
Study of the management methodology of network-based planning and control; detailed analysis of CPM, PERT, and GERT; computer procedures for complex networks.

Fundamentals of Contract Administration
Intensive survey of the principles and practices involved in the administration of contracts by and from federal agencies.

Legal Aspects of Contracts
Study of Governmental procurement laws and regulations, contract construction and interpretation, patents and copy rights, and the Uniform Commerical Code.

Financial Aspects of Contracts
Study of contract pricing techniques; financing of government contracts; allowable, disallowable, and allocable costs; indirect rate determinations; accounting methods; contract closings.

Contract Changes and Terminations
Detailed study of laws, regulations, and procedures pertaining to contract changes, supplemental agreements and change orders, stop work orders, terminations, and government contract liabilities. Prerequisite: MN 522 or 541 or equivalent.
Contract Negotiation
Detailed study of contract negotiation by and with governmental agencies with an emphasis on interfaces among the technical, administrative, and financial operations. Prerequisite: MN 522 or 541 or equivalent.

Fundamentals of Public Administration
Intensive survey of the principles and practices involved in the administration of governmental organizations.

Fundamentals of Industrial Administration
Intensive survey of the principles and practices involved in the administration of industrial organizations.

Industrial Personnel Administration
Study of personnel administration in an industrial organization: selection, training, and placement of personnel; merit training and promotion; salary and wage administration.

Industrial Labor Relations
Detailed study of labor laws, management-labor problems, organization and structure of labor unions, collective bargaining procedures and techniques, and union-management contracts.

Production Management
Study of the theory and application of demand forecasting, production and inventory planning and control, and product quality control. Prerequisite: college-level algebra.

Fundamentals of Logistics Management
An intensive survey of the management principles and practices involved in the general field of logistics.

Maintenance Management
Detailed study of the problems of product support and the maintenance of complex systems. Maintainability is related to the interacting effects of such factors as design engineering, reliability, technical documentation, and spare parts provisioning.

Inventory Management
Intensive study of the principles and techniques involved in the management of inventory. Topics include functions and lot size, identifying problems, forecasting, inventory control systems, and techniques to reduce inventory and backlogs.

Distribution Management
Detailed study of an integrated physical distribution system. The subsystems of transportation, warehousing, inventory control, materials handling, industrial packaging, order processing, and location analysis are studied under a total systems approach and cases.

Modern Technology (MT)

The following courses all require a knowledge of basic calculus and assume a background equivalent to a bachelor’s degree in engineering, physics, or a similar field. Additional prerequisites are as noted.

Foundations of Modern Technology I
General examination of the mathematical and physical foundations of modern technology. Elements of calculus, differential equations, chemistry, physics, and applied mechanics. This course is primarily intended to assist persons in updating previous training.
502 Foundations of Modern Technology II
A continuation of MT 501. Elements of electrical circuits, electronics, mechanics of materials, thermodynamics, fluid mechanics, engineering economics, and other selected topics. Prerequisite: knowledge of topics given in MT 501.

503 Physics of Modern Technology
Survey of advanced topics in physics as related to modern technology. Topics include classical mechanics, relativity, electromagnetic theory, quantum mechanics, and statistical mechanics. Prerequisite: 501 or a knowledge of basic calculus and physics.

504 Mathematics of Modern Technology
Survey of advanced topics in mathematics especially useful in modern technology. Topics include differential equations, Laplace transforms, vector analysis, matrices, and Fourier methods. Prerequisite: 501 or a knowledge of calculus.

511 Radar Technology
Intensive survey of radar theory, techniques, systems, and components. Appropriate for both specialists and non-specialists. Prerequisite: knowledge of basic electronic systems.

512 Infrared Technology
Intensive survey of the generation, transmission, and detection of infrared radiation, with emphasis on military and remote sensing applications.

513 Guidance Technology
Intensive survey of trajectory theory, stability and control theory, guidance and optimization theory, and modern guidance techniques and systems.

514 Rocket Propulsion Technology
Intensive survey of rocket propulsion theory, techniques, systems, and components. Appropriate for both specialists and non-specialists. Prerequisite: knowledge of basic thermodynamics.

515 Instrumentation Technology
Intensive survey of the theory and application of modern electronic instruments and instrumentation systems. Appropriate for engineers and scientists in all fields.

516 Laser Technology
Intensive survey of laser principles and systems with an emphasis on practical aspects, particularly in space and military applications.

517 Nuclear Technology
Intensive survey of the principles of nuclear energy, nuclear power systems, nuclear weapons, radiation effects, and radiation shielding.

518 Simulation and Modeling Technology
Intensive survey of simulation methodology with applications to systems analysis and synthesis. Prerequisite: basic knowledge of computer programming.

519 Digital Electronics Technology
Intensive survey of the analysis and design of digital logical circuits using discrete and integrated elements. Prerequisite: knowledge of basic electronic circuits.

520 Heat Transfer Technology
Intensive survey of heat transfer theory, applications, and devices, particularly as related to missiles and spacecraft. Prerequisite: knowledge of basic thermodynamics.

521 Flight Structures Technology
Intensive survey of the analysis and design of structures for missiles and spacecraft, with an emphasis on matrix methods. Prerequisite: knowledge of basic structures and materials.
522 Remote Sensing Technology
Intensive survey of principles and techniques of sensing characteristics of the earth and its environment by remote means.

523 Image Processing Technology
Intensive survey of the theory, hardware, and application of optical and digital image processing, coding, and transmission. Prerequisite: basic knowledge of data processing.

524 Communication Systems Technology
Intensive survey of theories and techniques involved in analog and digital communication systems. Prerequisite: knowledge of basic electrical theory.

525 Optics Technology
Intensive survey of the principles of optics and their applications in modern devices and systems.

551 High-Energy Astronomy
Study of the theories, techniques, and programs relating to x-ray, gamma-ray, and cosmic-ray astronomy. Prerequisite: basic knowledge of modern physics and astronomy desirable.

552 Digital Filters
Study of digital filtering techniques with applications to digital processing and data analysis. Prerequisite: basic knowledge of signal analysis and data processing.

554 Advanced Radar Systems I
Study of advanced radar systems and techniques. Typical topics include ground mapping radars; pulse compression techniques; ECM and ECCM; and radar cross-section analysis. Prerequisite: MT 511 or basic knowledge of radar systems.

555 Advanced Radar Systems II
Continued study of advanced radar systems and techniques. Typical topics include phase and frequency coding; digital signal processing; tracking algorithms; and clutter reduction techniques. Prerequisite: MT 554 or considerable experience in radar systems.
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ABOU-ZEID, MOHAMMED, B.Sc. (Alexandria University), M.Sc. (Assiut University), M.S. (Mississippi State University), Ph.D. (Purdue University). Visiting Assistant Professor of Industrial Engineering, 1973.

ADAMS, CURTIS H., B.S. (Mississippi State University), M.S.Ed. (Henderson State Teachers College), Ph.D. (Mississippi State University). Associate Professor of Biology, 1965, 1968.


ARENDALE, WILLIAM F., B.S. (Middle Tennessee State University), M.S., Ph.D. (University of Tennessee). Professor of Chemistry, 1964, 1966.

AUDEH, NADEEM F., B.S. (South Dakota State College), M.S., Ph.D.(Iowa State University). Professor of Electrical Engineering and Assistant Dean, School of Science and Engineering, 1964, 1970.


BAILEY, MARY P., B.S.N. (Georgetown University), M.S.N. (Georgetown University). Assistant Professor of Nursing, 1972, 1974.

BAUR, MARIAN K., B.S.N. (Emory University), M.S.N. (University of Alabama in Birmingham). Assistant Professor of Nursing, 1972, 1974.


BISHOP, F. MARIAN, B.A. (Drury College), M.A. (University of Kansas), M.A.Ed. (Syracuse University), Ph.D. (Washington University), M.S.P.H. (University of Missouri). Professor of Community Medicine; Chairman, Community Medicine Programs, 1974.


BOYER, D. ROYCE, B.M. (Butler University), M.A. (Catholic University of America), D.M.A. (University of Texas at Austin). Associate Professor of Music; Chairman, Department of Music, 1966, 1970.

BRAINERD, JEROME J., B.S., M.S. (University of Notre Dame), Ph.D. (Cornell University). Associate Professor of Aerospace Engineering; Chairman, Department of Mechanical Engineering, 1965.

BRINDLEY, THOMAS A., B.A. (University of Colorado), B.F.T. (Thunderbird Graduate School of International Management), B.S.Ed., M.A. (Ohio State University), Ph.D. (University of Michigan). Associate Professor of Education; Chairman, Department of Education, 1974.


BROWN, RICHARD A., B.S. (University of Mississippi), M.D. (Medical College of Georgia). Assistant Professor of Family Practice, 1973, 1974.

BROWN, ROBERT A., B.S. (U.S. Naval Academy), M.S., Ph.D. (Ohio State University). Associate Professor of Industrial Engineering; Chairman, Department of Industrial and Systems Engineering, 1967.


BUCHER, NORMAN J., B.S., M.S., Ph.D. (St. Louis University). Professor of Marketing; Chairman, Department of Business Administration; Assistant Dean, School of Humanities and Behavioral Sciences, 1973.

BURNS, ROBERT W., A.B. (Syracuse University). Graduate Study (The Sorbonne, France). Instructor in Philosophy, 1970.


CAMPBELL, JAMES H., B.A. (Miami University, Ohio), Ph.D. (Michigan State University). Associate Professor of Communications in Behavioral Medicine, 1974.

CAMPBELL, SAM, B.S. (Marietta College), M.S. (Ohio State University), Ph.D. (Purdue University). Assistant Professor of Biology, 1973.

CASAZZA, PETER G., B.S. (St. Lawrence University), M.S., Ph.D. (University of Iowa). Assistant Professor of Mathematics; Chairman, Mathematics Department, 1972, 1973.

CASTLE, JOHN GRANVILLE, JR., B.A. (University of Buffalo), Ph.D. (Yale University). Professor of Physics, 1969.


CHANG, MOU-HSIUNG, B.S. (Chung-Hsing University), M.S., Ph.D. (University of Rhode Island). Assistant Professor of Mathematics, 1974.

CLABAUGH, WEST A., B.S., M.S., M.D. (Oklahoma State University). Associate Professor of Dermatology, 1974.

COBLE, HAROLD DWAIN, B.S., (Kearney State College), M.S., Ph.D. (University of Nebraska). Assistant Professor of Chemistry, 1966.

COFFIELD, KENNETH E., A.B. (University of Kansas), M.A. (DePaul University), M.A., Ph.D. (University of Missouri). Associate Professor of Psychology, 1966, 1970.


CROSSLAND, KATHRYN, B.S., M.S. (University of Alabama, Tuscaloosa), Ed.D. (University of Florida). Professor of Nursing; Dean, School of Nursing, 1971.


DAVIS, JACK H., B.S., M.S., Ph.D. (Clemson University). Associate Professor of Physics; Acting Chairman, Department of Physics, 1966, 1969.

DeFOREST, SHERMAN E., B.S., M.S. (Michigan Technological University), Ph.D. (University of California, San Diego). Assistant Research Professor of Physics, 1975.


DILLARD, NANCY F., A.B., M.A. (University of South Carolina), Ph.D. (University of Tennessee). Assistant Professor of English, 1972, 1974.

DOANE, GEORGE B., III, B.S.E.E. (Swarthmore College), M.S.E.E. (Yale University), Ph.D. (Auburn University). Adjunct Associate Professor of Electrical Engineering, 1956, 1970.

DODSON, CHARLES L., B.S. (Emory and Henry College), M.S., Ph.D. (University of Tennessee). Associate Professor of Chemistry, 1966, 1968.


DOSS, DEVA CHITA, B.S. (University of Madras, India), B.Sc., M.Sc., Ph.D. (University of Poona, India). Associate Professor of Mathematics, 1969.


DOWDY, JAMES F., B.S., M.P.A. (University of Denver). Adjunct Assistant Professor of Public Administration, 1974.
DOWE, MARY C., B.S.N., M.S.N. (Emory University), Ed.D (University of Kentucky). Associate Professor of Nursing, 1973.

DOYLE, F.L., B.S., (University of Texas), M.S. (Louisiana State University), Ph.D. (University of Illinois). Adjunct Professor of Environmental Sciences, 1972.

ELEY, MICHAEL H., B.A. (West Georgia College), M.S., Ph.D. (University of Georgia). Assistant Professor of Biology, 1974.

EMERSON, MERLE THOMAS, B.S. (Whitworth College), M.S. (Washington State University), Ph.D. (University of Washington). Associate Professor of Chemistry, 1968.


ESSENWANGER, OSKAR M., B.S. (Technical University, Danzig), Diploma in Meteorology (University of Vienna), D.Sc. (University of Warzburg). Adjunct Professor of Environmental Science, 1971.


FLEMMING, JAMES, B.S., M.Ed. (Indiana University, Pennsylvania), Ph.D. (Michigan State University). Assistant Professor of Developmental Learning, 1974.

FORTE, ALDO, D.Sc. (University of Havana, Cuba). Associate Professor of Mathematics, 1966.


FROELICH, ROBERT E., A.B., M.D. (Washington University). Assistant Dean for Program Development and Evaluation; Chairman for Psychiatry Programs; Professor of Psychiatry, 1974.


GRANT, SILAS W., B.S., M.D. (University of Texas). Professor of Family Medicine; Associate Dean, School of Primary Medical Care, 1973.

GRAVES, BENJAMIN B., B.A. (University of Mississippi), M.B.A. (Harvard University), Ph.D. (Louisiana State University). Professor of Management; President, The University of Alabama in Huntsville, 1970.

GROHSE, EDWARD W., B.Ch.E., Ch.E. (Cooper Union Institute of Technology), Ph.D. (University of Delaware). Professor of Chemical Engineering, 1960.

GRUBE, GLORIA JEANETTE, B.S.N. (Indiana University), M.S.N. (University of Alabama). Assistant Professor of Nursing, 1972, 1973.

GUENTHER, GODEHARD A., B.S. (University of Goettingen, Germany), M.S., Ph.D. (University of Heidelberg, Germany). Associate Research Professor of Physics, 1969, 1972.


HARRINGTON, JAMES A., B.A. (Grinnell College), M.S., Ph.D. (Northwestern University). Assistant Professor of Physics, 1973.

HARRIS, J. MILTON, B.S. (Auburn University), Ph.D. (University of Texas at Austin). Associate Professor of Chemistry, 1973.


HELLER, HERTHA D., Perm. Teachers Certificate (Teachers College for Women, Hanover, Germany). Graduate Study (Vanderbilt University). Assistant Professor of German, 1965, 1969.

HENDRICKS, JOHN B., B.S. (University of Alabama, Tuscaloosa), M.S. (Southern Methodist University), Ph.D. (Rice University). Associate Research Professor of Physics, 1973.

HENRY, PATRICK, B.S. (St. Louis University), M.S. (Louisiana State University). Instructor of Bibliography, 1974.


HOOMANI, JAFAR, B.S., M.S., Ph.D. (North Carolina State University). Associate Professor of Mathematics; Dean, School of Science and Engineering, 1968, 1969.


HSIA, PEI, B.S. (National Taiwan University), M.S. (Pennsylvania State University), Ph.D. (University of Texas at Austin). Assistant Professor of Computer Science, 1974.
HUBER, DONALD S., A.B., M.D., (Duke), Assistant Professor of Internal Medicine (P/T).
HULL, HENRY LANE, A.B., M.A., Ph.D. (Georgetown University). Assistant Professor of History, 1971.
HUNG, RU J., B.S. (National Taiwan University), M.S. (University of Osaka), Ph.D. (University of Michigan). Assistant Research Professor of Fluid & Thermal Engineering, 1972.
JAMES, ROBERT E., B.S. (Carnegie Institute of Technology), M.A. (Hollins College), Ph.D. (University of Tennessee). Assistant Professor of Psychology, 1971.
JOHNSON, KENNETH E., B.S. (University of Alabama, Tuscaloosa), Ph.D. (California Institute of Technology). Adjunct Associate Professor of Environmental Sciences, 1973.
JONES, KAREN E., B.S.N. (University of Illinois), M.S.N. (Emory University). Doctoral Candidate (Georgia State University). Assistant Professor of Nursing, 1973.
KHEIR, NAHM A., B.S.E.E. (Ain-Shams University, Cairo, Egypt), Ph.D. (Hungarian Academy of Sciences). Assistant Professor of Electrical Engineering, 1969.
KIDRON, ARYEH, M.Sc. (Hebrew University, Jerusalem), D.Sc. (Technion, IIT, Haifa). Associate Research Professor of Physics, 1974.
KIRKPATRICK, SUE W., B.Sc., M.Sc., Ph.D. (The Ohio State University). Assistant Professor of Psychology, 1972.
KISER, JOHN E., A.B. (Central Wesleyan College), M.A. (Appalachian State University), Ph.D. (University of South Carolina). Assistant Professor of English, 1972, 1974.
LAUGHLIN, EDWARD H., B.A., M.D. (Duke University). Assistant Professor of Surgery (P/T); Chairman for Surgical Programs, 1974.
LEONARD, RICHARD C., B.S., M.A. (East Carolina College), M.A.T., Ph.D. (University of North Carolina). Associate Professor of Biology; Chairman, Department of Biology, 1968, 1972.

LESTER, RICHARD L., JR., B.A., M.D. (Vanderbilt University). Assistant Professor of Pediatrics (P/T); Acting Chairman of Pediatric Programs, 1974.

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LOTHROP, DENNIS C., B.S., M.S., Ph.D. (University of Utah). Visiting Assistant Professor of Sociology, 1974.


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MOEBES, JAMES D., A.B. (Samford University), B.D. (Southern Baptist Theological Seminary), M.A., Ph.D. (University of Alabama, Tuscaloosa). Assistant Professor of Education; Assistant to the President, 1972, 1974.

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OTTO, G. H., M.S., Ph.D. (Justus Liebig-University, Giessen). Assistant Research Professor of Physics, 1974.


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PENOT, DOMINIQUE M., B.A. (University of Aix-France), License (University of Montpellier), Ph.D. (University of Yale). Professor of Romance Languages, 1970.

PERRIN, MARJORIE M., B.S.N. (Medical College of Virginia), M.S.N. (University of Alabama in Birmingham). Assistant Professor of Nursing, 1973.

PERREAULT, JEAN M., B.S. (Rockhurst College), M.A. (Marquette University), M.L.S. (University of Wisconsin). Assistant Professor of Bibliography; Acting Director of Library, 1969.


POLLARD, JAMES D., JR., B.A. (University of Richmond, Virginia), M.A. (Purdue University). Temporary Instructor of Speech, 1974.


RAINEY, ROBERT LEE, B.A. (College of Wooster), Ph.D (University of North Carolina, Chapel Hill). Assistant Professor of Political Science, 1972, 1974.

RAY, H. COTTON, M.D. (University of Tennessee). Assistant Professor of Radiology (P/T); Assistant Professor of Pediatrics (P/T); Chairman for Radiology Programs, 1974.

RETTIG, LAWRENCE, B.A., M.A., Ph.D. (University of Iowa). Assistant Professor of German, 1973.

REHEINFURTH, MARIO H., B.S., M.S. (University of Darmstadt, Germany). Adjunct Associate Professor of Mechanical Engineering, 1959, 1970.

RILEY, CLYDE, B.S. (University of Rochester), Ph.D. (Florida State University). Associate Professor of Chemistry; Chairman, Department of Chemistry, 1967, 1968.


ROGERS, JON G., JR., A.B. (Kansas State Teachers College), M.A. (University of Arkansas), Ph.D. (University of New Mexico). Associate Professor of Psychology; Dean, School of Humanities and Behavioral Sciences, 1968, 1971.

ROISING, LORRAINE M., B.S., M.S. (University of Rhode Island), Ph.D. (Southern Illinois University). Assistant Professor of Biology, 1967.

ROWLAND, M. ELOISE, B.S. (Mississippi State College for Women), M.S. (Iowa State College), Ph.D. (University of Tennessee at Memphis). Associate Professor of Biology, 1967.

RUBIN, LINDA JEAN, B.S.N., (University of Alabama, Tuscaloosa), M.S.N. (University of Alabama), Birmingham, Assistant Professor of Nursing, 1972, 1974.

RUSH, JOHN EDWIN, JR., B.S. (Birmingham-Southern College), Ph.D. (Vanderbilt University). Associate Professor of Physics; Dean, School of Graduate Studies and Research, 1967, 1969.


SHANNON, ROBERT E., B.S. (Oklahoma State University), M.S. (University of Alabama, Tuscaloosa), Ph.D. (Oklahoma State University). Professor of Industrial Engineering, 1965, 1972.
SHARMA, PRABHA G., B.A. (University of Lucknow, India), M.A. (Kansas State University), M.L.S. (Alabama A&M University). Assistant Professor of Bibliography, 1971.


SMALLEY, LARRY L., B.S., M.S., Ph.D. (University of Nebraska). Associate Professor of Physics; Chairman, Department of Physics, 1967, 1973.

SMITH, HERBERT T., B.S. (University of Houston), M.D. (Baylor School of Medicine). Associate Professor of Family Medicine; Chairman for Family Practice Programs, 1973, 1974.

SPARKS, J. ELLIS, M.D., (University of Alabama). Chairman for Internal Medicine Programs; Professor of Medicine, 1974.

STEPHENS, G. GAYLE, B.S. (Missouri University School of Medicine), M.D. (Northwestern University). Professor of Family Medicine; Dean, School of Primary Medical Care; Chairman, Department of Family Medicine (The University of Alabama System Medical Education Program), 1973.

STEPHENS, WILLIAM D., B.S. (Western Kentucky State University), Ph.D. (Vanderbilt University). Adjunct Associate Professor of Chemistry, 1974.

STETTLER, JOHN D., B.S. (Notre Dame), Ph.D. (Massachusetts Institute of Technology). Adjunct Professor of Physics, 1965, 1974.


SULLINS, WALTER R., A.B. (Stetson University), B.D. (Southern Baptist Seminary), M.A., Ph.D. (Emory University). Associate Professor of Psychology; Chairman, Department of Psychology, 1966, 1971.

SUNG, CHI-CHING, B.A. (National Taiwan University), Ph.D. (University of California, Berkeley). Associate Professor of Physics, 1972.

SUTPHIN, IONA W., B.S.N. (University of Virginia), M.S.N. (Emory University). Chairman of Upper Division of the School of Nursing; Assistant Professor of Nursing, 1974.

TARTER, DONALD E., B.S. (Middle Tennessee State College), Ph.D. (University of Tennessee). Associate Professor of Sociology, 1966, 1969.


THOMPSON, KENNETH O., B.S., B.A.E., B.B.A., M.S. (University of Minnesota), Ph.D. (University of Alabama, Tuscaloosa). Associate Professor of Engineering; Director of Institutional and Research Support Services, 1969.

TONGDA, BONNIE JO, B.S.N. (Baylor University). M.A.S. (The University of Alabama in Huntsville). Assistant Professor and Director of Learning Resources Center in Nursing, 1972.


WALLACE, DONALD B., B.S., M.S., Ph.D. (University of Wisconsin). Assistant Professor of Mechanical Engineering, 1974.

WALTER, HANS, B.S., M.S., Ph.D. (University of Western Germany). Assistant Research Professor of Physics, 1973.

WARREN, IRIS, R.N. (Georgia Baptist Hospital), B.S.N. (Louisiana State University), M.S.N. (University of Alabama in Birmingham). Assistant Professor of Nursing, 1973.


WATTS, WILLIAM P., B.S. (U.S. Naval Academy), M.B.A. (New York University), Graduate Study (University of Alabama, Tuscaloosa). Assistant Professor of Economics and Business Administration, 1971.


WHARRY, RHODA E., B.S.E. (University of Arkansas), M.S. (Memphis State University), Ph.D. (Purdue University). Associate Professor of Education; Chairman, Developmental Learning Program, 1967.


WHITE, CAROLYN W., A.B. (Woman's College of the University of North Carolina), M.A., Ph.D. (Duke University). Assistant Professor of Political Science; Chairman, Department of Political Science, 1967, 1974.


WILHELM, MICKEY, B.S.E., M.S.E., Ph.D. Candidate (The University of Alabama in Huntsville). Instructor of Industrial Engineering, 1973.


WILLICE, ROBERT L., B.A., M.D. (University of Nebraska). Assistant Professor of Obstetrics and Gynecology (P/T); Chairman for Obstetrics and Gynecology Programs, 1974.


WILSON, HAROLD J., B.S. (Alabama A&M University), M.S. (Iowa State University), Ph.D. (University of Arizona). Associate Professor of Biology, 1972.

WILSON, JAMES L., B.A., M.A., Ph.D. (Indiana University). Professor of Linguistics; Vice President for Academic Affairs, 1972.


WU, SHI TSAN, B.S. (National Taiwan University), M.S. (Illinois Institute of Technology), Ph.D. (University of Colorado). Professor of Engineering, 1967, 1972.


WYSKIDA, RICHARD M., B.S.E.E. (Tri-State College), M.S.I.E. (University of Alabama, Tuscaloosa), Ph.D. (Oklahoma State University). Associate Professor of Industrial and Systems Engineering, 1974.

**Lecturers**

(Date refers to original appointment to the University.)


BOWDEN, CHARLES M., B.S. (University of Richmond), M.S. (University of Virginia), Ph.D. (Clemson University). Lecturer in Physics, 1971.


DAILEY, GRACE E., A.B. (Colby College), M.Ed. (Harvard University). Lecturer in English, 1967.


GLAESER, JOHN ROGER, B.S., M.S., Ph.D. (University of Missouri). Lecturer in Engineering, 1972.

GOODRUM, JOHN C., B.S.C.E. (Mississippi State University), M.S. (Iowa State University). Lecturer in Modern Administration, 1974.


GREENWOOD, TERRY F., B.M.E. (Georgia Institute of Technology), M.S.M.E. (University of Southern California), Ph.D. (University of Texas). Lecturer in Modern Technology, 1973.

GUDAITIS, WILLIAM V., B.S. (University of Detroit), M.S. (Massachusetts Institute of Technology), M.S. (The University of Alabama in Huntsville). Lecturer in Industrial and Systems Engineering, 1972.

GUINN, GERALD R., B.M.E. (Auburn University), M.S.M.E. (Purdue University), Ph.D. (University of Alabama, Tuscaloosa). Lecturer in Engineering, 1967.


HELM, JAMES C., B.S., M.S. (University of Missouri), Ph.D. (Texas A&M University). Lecturer in Computer Science, 1974.


JACKSON, DONALD, B.S. (Jacksonville State University), M.A., Ph.D. (University of Oklahoma). Lecturer in Administrative Science, 1970.


JOHNSON, LLOYD A., B.S. (Florence State University), M.A.S. (The University of Alabama in Huntsville). Lecturer in Modern Administration, 1974.


KHEIR, FERAL, B.A. (Ain-Shams University), Ph.D. (Budapest University). Lecturer in English, 1970.


KLEISNER, JOHN A., B.S. (DePaul University), M.B.A. (University of Chicago). Lecturer in Modern Administration, 1974.

LACY, LEWIS L., B.S., M.S. (Virginia Polytechnic Institute), Ph.D. (University of Tennessee). Lecturer in Physics, 1972.

LAWLER, PATRICK B., B.S.I.E. (Mississippi State University), M. Engr. (Texas A&M University). Lecturer in Modern Administration, 1974.


MAC ILVEEN, KYRA, B.A. (Whitman College), Diplome (University of Aix, Marseille, France), M.Ed. (University of Oregon). Lecturer in Russian, 1975.

MALKMUS, BERNARD R., B.S. (University of Kansas), M.D.A. (University of Wichita). Lecturer in Accounting, 1963.


MC CARTY, JOHN P., B.S.M.E. (Massachusetts Institute of Technology), M.S.M.E. (The University of Alabama in Huntsville). Lecturer in Mechanical Engineering, 1972.


MURCHISON, JOHN H., Lecturer in Journalism, 1974.

NOBLE, HARRY, Lecturer in Music, 1974.


PARKER, WILLIAM A., JR., B.S. (Louisiana State University), M.A.P.A. (University of Oklahoma). Lecturer in Modern Administration, 1972.


SCALES, JEANNE D., B.A. (Millsaps College), LL.B. (Jackson School of Law). Lecturer in Modern Administration, 1973.


STEWART, ROBERT E., B.S. (University of Tennessee), M.D. (University of Tennessee). Lecturer in Pediatrics, 1975.

TATOM, FRANK B., B.S. (U.S. Naval Academy), M.S.M.E. (Auburn University), Ph.D. (Georgia Institute of Technology). Lecturer in Mechanical Engineering, 1974.


THOENES, JURGEN, Diplom Ingenieur (University, Munich, Germany), Ph.D., (University of Alabama, Tuscaloosa). Lecturer in Mechanical Engineering, 1974.


WANN, PORTER T., B.S. (University of Alabama, Tuscaloosa), M.A.S. (The University of Alabama in Huntsville). Lecturer in Modern Administration, 1974.
WDOWIAK, THOMAS J., B.A. (University of South Florida), A.A.S. (Broome Technical Community College), Ph.D. (Case Western Reserve University). Lecturer in Physics, 1974.


WEBB, ROBERT C., B.S., M.S. (East Tennessee State University). Lecturer in Physics, 1967.

WERKHEISER, ARTHUR H., JR., B.S. (Lafayette College), M.S., Ph.D. (University of Tennessee). Lecturer in Physics, 1969.


WILLIGE, LARRY, Instructor in Health, Physical Education and Recreation, 1974.


WORLEY, MARVIN L., B.S. (University of Georgia), M.S. (University of Alabama, Tuscaloosa). Lecturer in Modern Administration, 1975.


Clinical Faculty


BAKER, GRADY L., M.D. (Louisville). Family Practice - General Practice.

BASORE, JOHN W., A.B., M.D. (Alabama). Family Practice - General Practice.


BERG, ERNESTINE H., B.S., M.D. (Louisville). Anesthesiology.


BOGGESS, JOHN W., III, B.S., M.D. (Emory). Family Practice - General Practice.

BOOHER, PETER C., B.A., M.D. (Emory). Radiology.


BUTLER, CHARLES L., B.S., M.D. (Maryland). Pathology.


CAMP, EPHRIAM E., Ph.C., M.D. (Tennessee). Radiology.

CAMPBELL, JAMES E., M.D. (Tennessee). Radiology.


CARTER, WILLIAM W., M.D. (St. Louis). Urology.

CAUTHEN, FRANK M., B.S., M.D. (Alabama). Family Practice - General Practice.
DITORO, PETER, B.S., M.D. (Hahmemann). Family Practice - General Practice.
ENNIS, JOHN M., M.D. (Alabama). Dermatology.
FRIERSON, WALLACE B., B.S., M.D. (Tennessee). Family Practice - General Practice.
GRAY, EDWIN R., B.S., M.S., M.D. (Alabama). Family Practice - General Practice.
GREENWALD, DAVID W., A.B., M.D. (Temple Medical School). Internal Medicine.
HEWETT, BILL V., B.S., M.D. (Texas). Radiology.
HOLLIMAN, JAMES D., B.S., M.D. (Alabama). Dermatology.
JOHNSON, S. MILLARD, B.S. (Samford). Administration.


LAMON, EDWARD C., B.S., M.D. (Hahnemann Medical College) Pediatrics.


MARCUS, ELLIOT L., M.D. (Duke). Internal Medicine.

MARTINEC, LEONARD W., B.S., M.D. (Mississippi). Family Practice - General Practice.

MAXWELL, OSCAR N., M.D. (Georgia). ENT - Otolaryngology.


MOORE, BERNIE H., JR., M.D. (Louisiana State University). Family Practice - General Practice.


PEWITT, H. MAC, JR., B.S., M.D. (Tulane). Family Practice - General Practice.


PLOUSSARD, JOHN H., M.D. (St. Louis). Pediatrics.


RICE, JOHN B., B.S., M.D. (Tulane). Family Practice - General Practice.


RICHARDSON, JAMES W., B.S., M.D. (Emory). Family Practice - General Practice.

RINN, ROGER C., B.A., M.A., Ph.D. (Georgia State). Clinical Psychology.
ROBERTSON, J. EARL, B.S., M.D. (Alabama). Family Practice - General Practice.


RUTLEDGE, JAMES W., A.B., M.D. (New York University). Family Practice - General Practice.


SLOYER, JOHN L., JR., B.S., Ph.D. (West Virginia). Medical Microbiology.


STRIPLIN, W. HOWARD, B.S., M.D. (Alabama). Family Practice - General Practice.


THOMPSON, IRA D., B.S., M.D. (Alabama). Family Practice.


WILLIAMS, THOMAS R., M.D. (Tennessee). Family Practice - General Practice.


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For Further Information

Address the following offices at
P.O. Box 1247
Huntsville, Alabama 35807

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