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 continue 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.
Legend
1. Morton Hall
2. University Union
3. Library
4. Humanities Building
5. Science & Engineering Building
6. Madison Hall
7. Research Institute
8. School of Primary Medical Care, University Health Center Building
9. Art Museum
UAH Parking ———

Campus Map

Legend
1. Morton Hall
2. University Union
3. Library
4. Humanities Building
5. Science & Engineering Building
6. Madison Hall
7. Research Institute
8. School of Primary Medical Care, University Health Center Building
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UAH Parking ———
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Academic Calendar

Fall Term, 1974

Early Registration ......................................... July 25 – August 7
Placement Tests ............................................. July 29 & August 28
Orientation ................................................... August 7 & September 4
Application Deadline ....................................... August 22, Thursday
Registration .................................................. September 5, Thursday
Classes Begin 8:00 a.m. .................................. September 9, Monday
Late Registration ............................................ September 9, 10
Deferred Examinations (Summer Term) .................. September 14, Saturday
Mid-Term ...................................................... October 11, Friday
Examinations ................................................. November 18, 19, 20 & 21

Winter Term, 1974-75

Early Registration ........................................... October 24 – November 6
Placement Tests .............................................. November 15, Friday
Orientation .................................................... November 22, Friday
Application Deadline ....................................... November 28, 29
Thanksgiving Holidays ...................................... November 28, 29
Registration ..................................................... December 2, Monday
Classes Begin 8:00 a.m. .................................. December 4, Wednesday
Late Registration ............................................. December 4, 5
Deferred Examinations (Fall Term) ....................... December 7, Saturday
Student Christmas Holidays ................................ December 23 – January 1
Classes Resume 8:00 a.m. ................................ January 2, Thursday
Mid-Term ....................................................... January 17, Friday
Examinations ................................................... February 24, 25, 26 & 27

Spring Term, 1975

Early Registration ........................................... January 30 – February 12
Placement Tests .............................................. February 21, Friday
Orientation ..................................................... March 5, Wednesday
Application Deadline ....................................... February 27, Thursday
Registration ..................................................... March 6, Thursday
Classes Begin 8:00 a.m. .................................. March 7, Friday
Late Registration ............................................. March 7, 10
Deferred Examinations (Winter Term) ................... March 8, Saturday
Mid-Term ....................................................... April 11, Friday
Student Spring Holiday ..................................... March 28, Friday
Classes Resume 8:00 a.m. ................................ March 31, Monday
Examinations ................................................... May 19, 20, 21 & 22
Commencement ............................................... May 25, Sunday
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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, or national origin.
Center for Environment Studies
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 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, 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 is offered, and a Master of Arts degree in developmental learning was added during 1973-74. 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 or a functional nursing specialty. 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 Medical Education System, 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 115,000 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 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 Admission 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 of two new campus buildings for the School of Primary Medical Care at present houses administrative offices, instructional facilities, and the beginnings of the University Health Service, which eventually will occupy the entire building. The UAH-Huntsville Hospital model Family Practice Center is located in the Huntsville Medical District downtown.

Instructional Media Service
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 lends and operates a wide variety of equipment, produces video tape presentations, prepares slides and transparencies, and directs faculty members to rental sources of recordings, slides, 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>Private Apartment</td>
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<td>2 Students per Apartment (private room)</td>
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<td><strong>Three Bedroom Apartment:</strong></td>
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<tr>
<td>Private Apartment</td>
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<td>3 Students per Apartment (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 895-6445 or 895-6108.
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 $10.00.*
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).

*Effective October 1, 1974, the application fee will be $15.00.
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 someone 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 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 $10.00.*
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. 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.

*Effective October 1, 1974, the application fee will be $15.00.
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 the 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.

Out-of-State Student

Under a policy established by the Board of Trustees of The University of Alabama, the following definitions, based on Alabama law, shall apply:

1. Minor students are defined to be students under 21 years of age or under 18 years of age if married, except students who have been defined otherwise by court action.
2. The residence of a minor student is determined to be the residence of his parent(s) or legally appointed guardian.
3. The residence of a minor student for the year prior to the time that he ceases to be a minor as defined in item 1 is determined also to be the residence of his parent or legally appointed guardian.

An in-state student is one who is a citizen of the United States of America or who has an alien registration card and is awaiting naturalization and who:

1. has been a legal resident of the State of Alabama for at least one year immediately preceding any registration by the student at the University, or whose spouse has been a legal resident of the State of Alabama for such period, or one of whose parents or whose legal guardian has been a legal resident of the State of Alabama for such period; or
2. is a member of the armed forces of the United States or other governmental agency and officially stationed in Alabama at the time of any registration at the University, unless such assignment is solely for the purpose of attending The University of Alabama in Huntsville, or whose spouse, or (in the case of minor students) one of whose parents or whose legal guardian, is a member of the
armed forces of the United States or other governmental agency
and officially stationed in Alabama at the time of any registration
at the University, unless such assignment is solely for the purpose
of attending the University of Alabama in Huntsville; or
3. is a minor and one of whose parents or legal guardian has taken
full-time permanent employment in the State; or
4. who is not a minor and holds full-time permanent employment in
the state and takes a part-time academic load as defined in this
catalog.

All students not in one of the above categories for in-state status are
deemed to be out-of-state students for fee purposes.

Once a student has registered at The University of Alabama in
Huntsville, the classification for tuition purposes shall remain unchang­
ed in the absence of satisfactory evidence to the contrary. Such
evidence must be reduced to writing and filed with the University
Registrar, who shall determine whether, according to the above
standards, a change in classification shall become effective at the time
of the student’s next registration.

It shall be the policy of The University of Alabama in Huntsville to give
priority to those qualifying as “in-state” students in admission to
professional schools or other programs with restrictive admission
policies.

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 institu­
tion.
Expenses per Term

Full-Time Students Taking 8 to 13 Semester Hours (Undergraduate)
Alabama Resident .................................................. $198.00
Non-Resident ..................................................... $396.00

Full-Time Students Taking More Than 13 Semester Hours (Undergraduate)
Alabama Resident .................................................. $198.00
plus $20 per semester hour for each hour in excess of 13.
Non-Resident ..................................................... $396.00
plus $40 per semester hour for each hour in excess of 13.

Full-Time and Part-Time Students Taking 5 or More Semester Hours (Graduate)
Alabama Resident .................................................. $228.00
Non-Resident ..................................................... $456.00

The above identified costs include course fees, building fees, student union fees, registration fees, and a student activity fee. An out-of-state fee is included for all non-resident students.

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*
For Non-Residents, an Additional Charge 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*
*A Student Union Fee of $1.75 is included in the cost of the first hour only for each person enrolled each term.
Student Activity Fee ................................ $ 4.00
For Non-Residents, an Additional Charge per Semester Hour . $ 50.00
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.

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.

Fees for non-credit courses vary and are announced in individual brochures.

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 in one term is charged a maximum fee of $5.00)
Installment or Deferred Fee ....................................... 5.00
(Accounts not paid in full by 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
<table>
<thead>
<tr>
<th>Service</th>
<th>Fee</th>
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<tbody>
<tr>
<td>3rd Check</td>
<td>5.00</td>
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<tr>
<td>Replacement of I.D. Card</td>
<td>2.00</td>
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<tr>
<td>Transcript Fee-first transcript free</td>
<td>2.00</td>
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<td>transcript free-each additional copy</td>
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<td>No transcript will be issued for a person</td>
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<td>who has a financial obligation to the</td>
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<td>University.</td>
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<td>Cap and Gown Rental or Purchase—Handled</td>
<td>15.00</td>
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<td>through the Book Nook</td>
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<td>Graduation Fees</td>
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<td>(If qualifications for graduation are not</td>
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<td>met and if diploma has been ordered, $10.00</td>
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<td>will be refunded.)</td>
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<tr>
<td>Duplicate Diploma</td>
<td>7.50</td>
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<tr>
<td>Thesis Binding Fee (3 copies)</td>
<td>13.00</td>
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<tr>
<td>Each Additional Copy</td>
<td>4.25</td>
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<tr>
<td>Vehicle Registration Fee</td>
<td>5.00</td>
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</table>

Fees may be paid in two equal installments. An additional charge of $5.00 is made for this option. Accounts not paid in full by 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.

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:

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 in 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.

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.
CONTIGUOUS STATES SCHOLARSHIPS
The University provides limited scholarships annually to academically qualified students (at the undergraduate or graduate levels) whose legal residence is in a state which has a border contiguous with the State of Alabama. In order to qualify, students must be accepted as a full-time student in a non-probationary status. The recipient will receive a tuition scholarship amounting to $175/term at the undergraduate level and $228/term at the graduate level as long as they continue to qualify for the scholarship. Renewal of the scholarships requires that students: retain full-time status; show progress toward a degree; remain in satisfactory financial standing with the University; and continue to reside as a legal resident of a state which has a border contiguous with the state of Alabama.

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 full tuition scholarship to one of 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 he is usually advised not to borrow more than half of what he needs 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.

Under new rules effective March 1, 1973, colleges and universities have the responsibility of determining the loan amount a student should get and recommending that the lender make the loan in the amount determined. Determination of a student's eligibility for federal interest benefits is based upon the institution's recommendation for the need of the loan.

The maximum amount a student may borrow in an academic year may not exceed $2,500.

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 be:

*(1) enrolled for the first time in a post-high school program at an eligible college, university, vocational or technical school; (after July 1, 1973)*

*(2) attending school on a full-time basis; and*

*(3) a U.S. citizen or in the United States for other than a temporary purpose and intend to become a resident.*

**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.

*Subject to change due to availability of funds.*
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 115, 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.
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's 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, and the foreign language and chemistry placement tests.

Tutoring Services
Tutoring services are coordinated through the Office of Counseling and Testing. Students who are eligible for the Veterans Educational Assistance Program may be reimbursed for tutoring arranged through this Office. Other students are eligible for an SGA subsidy for one-half the cost of tutoring. 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.

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 any time 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 or 895-6108.

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. To carry out the official business of the organization, there exists an SGA executive branch and a sixteen member legislature.

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 the Coordinator of Union Activities, are located on the second floor. Intercollegiate athletics and intramurals also have an office 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, is a paperback bookstore stocking general and supplementary reading, and some required titles. In addition to school and art supplies, the Book Nook stocks records, tapes, campus wear and a full line of gift items. Rental or purchase of caps and gowns is handled here for the students, faculty and staff. As a service, the staff of the Book Nook will special order any hardback or paperback book in print.

The Textbook Store, located in Morton Hall, stocks the majority of the required titles for classes, and a large line of office and school supplies. A printed booklist is available for student use three weeks prior to the beginning of classes each term.

Hours for both stores are:

- **Monday - Thursday**: 9 A.M. - 6 P.M.
- **Friday**: 9 A.M. - 5 P.M.

Special hours are announced for registration and the first week of classes.

**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.

Baha'i Kull-I-Shay' Society
Baha'is are followers of the Prophet Baha'u'llah who taught in Persia and Israel in the last of the 19th century. The Baha'i Kull-I-Shay' Society (Persian for "all things") at the University attempts to spread the teachings of Baha'u'llah which include the oneness of God. Membership is open to the entire 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.

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.

Gammi Xi
Gammi Xi is a service organization open to all women students and is affiliated with the national Gamma Sigma service organization. Gammi 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 disseminating 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

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 publica-
tion 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.

Scholastic Society for Freshman Women
The Scholastic Society for Freshman Women is an organization which honors high scholastic achievement during the first year in college. To become a member, a student must earn a scholastic average of 2.5 during her first, second, or third quarter of enrollment. The UAH society is in the process of applying for affiliation with the national society, Alpha Lambda Delta.

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 GPA 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, and 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), Alpha Lambda Delta (freshman women's honorary), 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 to events by showing their UAH I.D. card at the door. 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, crew, golf, 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.
Rowing
Rowing is the oldest intercollegiate 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.

Golf
Golf is the newest addition to the UAH athletic program. The UAH team played its first intercollegiate schedule during the season.

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.

Choral Organizations
UAH has five choral organizations open to all University students: The UAH Choir, The Premier Singers, the Huntsville Village Singers, The Choral Union, and The Summer Chorus. Membership is open to all students; course credit is offered. Participation in any of the five groups may be repeated. (See course listings in the Department of Music section for details and a complete listing.)
The UAH Choir
The UAH Choir, the first choral ensemble to be organized at UAH, is composed of from thirty to forty students. These students perform the choral literature of the great masters of music history. Their repertoire includes music of the masters and outstanding arrangements of folk music from several countries.

The Premier Singers
The Premier Singers are spirited men and women students who perform popular music. The group provides light-hearted entertainment for campus and community organizations and serves as an outlet for UAH students who enjoy singing together.

The Huntsville Village Singers
The Huntsville Village Singers is a small, elite group of mixed voices performing a broad range of madrigal and choral chamber music as well as presenting choreographed medleys and tunes from Broadway and Hollywood. The Village Singers were one of ten college musical groups selected for 1972 and 1974 USO overseas tours to the Far East and Europe.

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

The 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.

The 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.

UAH Wind Ensemble
Rehearsal and performance of the finest available music literature for wind ensemble and concert band. Open to all University students by audition and approval of instructor.

The Huntsville Symphony Orchestra
A unique opportunity awaits the instrumental student who can qualify
for the Huntsville Symphony Orchestra. The Orchestra numbers 75 members. A student would learn a broad spectrum of orchestra literature since the orchestra prepares six or seven programs each year with five performances given in pairs. With four international artists added to the program, some of whom are also engaged for recitals and workshops on campus, the student is given a most unusual exposure to the world of symphonic music. An instrumentalist gains valuable training and experience for future employment in a symphony orchestra while pursuing course study toward a degree. Credit is given by the University, and the Huntsville Symphony Association pays a stipend for each rehearsal and concert.

Student Publications

The official student newspaper, exponent, is published biweekly. This campus publication 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 Instruction

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>600-899</td>
<td>Graduate</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 (with essay)</td>
<td>EH 101, 102</td>
</tr>
</tbody>
</table>

58
*English Composition  
(composite score)  
60–62 = B  
63–80 = A  
Elementary Computer Programming — Fortran IV  
54–58 = B  
59–80 = A  
General Chemistry (must first take placement exam)  
48–52 = C  
53–61 = B  
62–80 = A  
Introductory Accounting  
57–62 = B  
63–80 = A  
Introductory Business Law  
57–62 = B  
63–80 = A  
Introductory Economics  
54–61 = B  
62–80 = A  
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**

Computer Science  
All Courses  
Mathematics  
MA 104, 105, 133, 143, 153, 154, 233
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.

The official date of withdrawal is the date on which the withdrawal form is received in the Office of Admissions and Records. Action will be taken on courses involving withdrawals based on the following conditions:

1. A grade of W will be assigned if the withdrawal occurs during the first three weeks of class.
2. A grade of W or WF will be assigned if the withdrawal occurs between the end of the third week and the beginning of the sixth week of classes.
3. A grade of F will be assigned if the withdrawal occurs after the beginning of the sixth week except in cases of extenuating circumstances. If the student so desires, he may submit the circumstances in writing on a Request for Withdrawal Form and ask for a review by the dean of the school in which he is enrolled.
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 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.

(Refer to X under Grades and Quality Points for regulations concerning deferred examinations. Student taking deferred examinations must pay a fee of $2.00.)

Grades

<table>
<thead>
<tr>
<th>Grades</th>
<th>Quality Points/Semester Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Superior</td>
<td>3</td>
</tr>
<tr>
<td>B Above Average</td>
<td>2</td>
</tr>
<tr>
<td>C Average</td>
<td>1</td>
</tr>
<tr>
<td>D Passing</td>
<td>0</td>
</tr>
<tr>
<td>F Failure</td>
<td>0</td>
</tr>
</tbody>
</table>
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.

X 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.)

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

WF 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 some 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 50% 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 student’s record is examined at the end of any term in which at least 8 semester hours have been attempted.

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>0</td>
<td></td>
<td>Probation Removed</td>
</tr>
<tr>
<td>Less than 1.0 and</td>
<td>1.0 or higher or</td>
<td>7 or less</td>
<td>Probation Continued</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, John C. Calhoun Junior College, Oakwood College, and The University of Alabama in Huntsville. Under this arrangement, a student at any of the participating institutions may request permission to attend a class at one of the other schools. Conditions governing the granting of permission include the following:

1. The student must be a full-time student.
2. The student must have an overall C average.
3. The course desired must be unavailable at the student's home institution.
4. The student's request must be approved by his advisor and other appropriate personnel.
5. Permission of the institution teaching the course 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 and 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 applied to 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.

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 $1.00 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:

<table>
<thead>
<tr>
<th>Art</th>
<th>German</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business (options in Accounting, Finance, Management)</td>
<td>Music</td>
</tr>
<tr>
<td>Economics</td>
<td>Political Science</td>
</tr>
<tr>
<td>English</td>
<td>Psychology</td>
</tr>
<tr>
<td>History</td>
<td>Slavic Studies</td>
</tr>
<tr>
<td>French</td>
<td>Sociology</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Biology</th>
<th>Mechanical Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry</td>
<td>Industrial and Systems Engineering</td>
</tr>
<tr>
<td>Computer Engineering</td>
<td>Mathematics</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>Mathematics Education</td>
</tr>
<tr>
<td>Structural Engineering</td>
<td>Physics</td>
</tr>
<tr>
<td>Environmental Engineering</td>
<td></td>
</tr>
</tbody>
</table>

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 secondary area of concentration, may pursue study that will enable them to begin practice in one of the following functional areas:

- Teaching Technical Nursing
- Supervising Nursing Practice
- Administering Delivery of Nursing Care
- Practicing as Clinical Specialists

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, Economics, English, French, 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 Programs with Professional Specializations
- Unified Professional Program with Selected 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. 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, 136 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 74.) 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 allows 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

I. General Education Phase

The general education phase provides the foundation for liberal learning and includes writing, literature, history, social science, natural sciences, mathematics, and foreign 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

<table>
<thead>
<tr>
<th>HUMANITIES &amp; BEHAVIORAL SCIENCES</th>
<th>Semester Hour</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 One discipline</td>
<td>6</td>
</tr>
<tr>
<td>If major is economics or psychology, the social sciences requirement should be taken in one of the other disciplines.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign Language</td>
</tr>
<tr>
<td>(See section entitled Modern Foreign Languages.)</td>
</tr>
</tbody>
</table>
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, excluding environmental sciences

b. 8 hours in each of two laboratory sciences, excluding environmental sciences

c. 3 hours mathematics; 8 hours one laboratory science, excluding environmental sciences; 4 hours another laboratory science (environmental sciences is included)

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>
</tr>
</thead>
<tbody>
<tr>
<td>English Composition</td>
</tr>
<tr>
<td>Survey of English Literature</td>
</tr>
<tr>
<td>Origins and Development of the Contemporary World</td>
</tr>
<tr>
<td>Economics, Political Science, Psychology, Philosophy, or Sociology (one discipline)</td>
</tr>
<tr>
<td>Foreign Language</td>
</tr>
<tr>
<td>(See section on Modern Foreign Languages)</td>
</tr>
</tbody>
</table>

SCIENCE – MATHEMATICS

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.

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>Semester</th>
<th>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 academic year of general biology or zoology
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, electives taken in biology should be genetics and embryology. 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 Medical Education System — 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>Biology</td>
<td>8</td>
</tr>
<tr>
<td>Inorganic chemistry (including qualitative analysis)</td>
<td>8</td>
</tr>
<tr>
<td>Organic chemistry</td>
<td>8</td>
</tr>
</tbody>
</table>
4. Quantitative analysis  
5. Physics (including laboratory)  
6. College algebra and trigonometry  
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.  
8. The completion of a minimum of 90 semester hours of collegiate work.

Students should elect courses in mathematics through calculus and should not elect biology courses that constitute a part of the dental school curriculum.
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, are also offered. Requirements for these degrees and course descriptions are listed in this section.

Administrative Science

A Master’s Degree Program

Professors: Shannon; Associate Professors: Brown, Mirakhor, Olsen (director), Rogers, Wyskida; Assistant Professors: Hays, Smith, Wu; Adjunct Professor: McDaniel.
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 251 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.
Survey 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 standpoints 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 Methods in Management Science I 3 hrs.
Introduction to the basic concepts underlying mathematical and quantitative techniques for decision-making at the managerial level. This course is intended to acquaint the student with Operations Research and other quantitative tools being used with increasing frequency by managers in decision-making. Cost analyses, applications of probability theory, linear programming techniques and game theory will be covered.

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 455.

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 455
Electives: AS 628, AS 631, 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 627
Electives: EG 523, EG 526, EG 632, EG 633, EG 634

Operations Research Option:
Required: EG 625 (AS 627 will suffice as a prerequisite)
Electives: EG 527, EG 629, EG 634, EG 635, EG 637

Public Administration:
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, Dempsey, Pope (Chairman); 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 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 on the basis of the examples of art work and supporting data and, at the discretion of the art faculty, achievement on a special performance project or projects. Transfer students who receive a degree with a speciality in art from 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 comprises a related group of courses in advertising layout, typographic and lettering design, commercial art, illustration, and film techniques such as animation which relate to graphics applications of photography.

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 6 semester hours of history of art (Art 100 and 101) in a foundation program of 18 to 22 semester hours of courses in the 100 series; and upper division work of 22 semester hours as detailed below.

Plan I Art Program

1. Major in Studio Specialties (painting, communication graphics, and sculpture):
Lower Division Foundation Program (22 semester hours)
Drawing, 6 hours (3 courses); design, 4 hours (2 courses); sculpture, 4 hours (2 courses); photography, 2 hours; and art history, 6 hours (100, 101).

Upper Division (22 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 of 2 hours each at the 300 level in studio areas outside the major studio specialty each in a different area or both in the same area), and Art History 310.

Senior year — 6 hours (3 courses) in the major studio area at the 400 level and 3 hours of art history at the 300 level or above.

2. Major in Art History Specialty:

The art history major includes introductory experiences in studio areas to provide insight into artistic experiences for those whose function it is to discuss and relate and evaluate the work of artists of the past and present.

Lower Division Program (18 semester hours)
a. 12 hours of art history (Art 100, 101, 109 and 3 additional hours 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 (Art 310 and 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 Certification:

A. For Class B Secondary Art Professional Teaching Certificate, Grades 7-12. The cluster of 21 hours would include 18 hours in a cognate subject approved as a teaching minor by the State Department of Education. A list of these is available in the Art Office.
Lower Division (18 semester hours)
6 hours of art history (from Art 100, 101, 109); 12 hours in studio (6 courses) with at least one course at the 100 level in each of three areas: design, drawing, sculpture. Photography (Art 165) is recommended (not counted as drawing or design). Prerequisities for upper division courses should be kept in mind in selecting courses.

Upper Division (22 or 23 semester hours)
3 hours of Art History 310 and 3 hours of art history at 300 level; 2 hours of painting (Art 370 or 371 or 373); 12 hours (6 courses) in studio, including at least two areas in addition to painting, at least 4 hours of which will be at the 300 level, and art elective, 2 to 3 hours. Graphics (Art 382 or 383) is recommended.

B. For Class B Elementary-Secondary Art Teaching Certificate, Grades 1-12. The State Department of Education, recognizing the greater breadth of preparation required for art teaching at both secondary and elementary levels along with preparation for art supervision accepts a major in studio and applied art areas and a minor grouping emphasizing historical aspects of art. The studio major should include a minimum sequence of studio courses distributed as in (A) above, with additional studio courses to total 32 hours, including 12 hours of upper division courses. At least 15 hours of the supportive cluster should be in art history with the balance in art related courses. Both Elementary Art (ARS 215) and Secondary Art Methods (ED 388—Art) should be scheduled. The student teaching should include both elementary and secondary experience, arranged through the Department of Education.

C. For a B.A. degree with a Class B Elementary Professional Teacher’s Certificate. Art courses for an art major as listed in (A) above. The cluster is made up of required courses in education. (See section on Education.)

Basic requirements for teacher certification (secondary and elementary) are identified in the Education section of the catalog. Teacher education courses relating to art teaching certification include: ED 388—Art Secondary Art Methods; ARS 215, Art for Elementary Teachers; ED 497, Secondary Student Teaching in Art, and ED 491, Elementary Student Teaching in Art.
NOTE:
The minimum art course content required for a secondary certificate in art is not adequate as an undergraduate background for graduate work in art or as a basis for an art career. It is also minimal as a basis for teaching in a developed secondary art program. For these reasons, the student should schedule additional art courses where possible relating to his goals (career, graduate work, a more adequate preparation for art teaching).

Plan II Art Program for the Exceptional Student

Plan II involves a supplement to the major requirements stated under Plan I.

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 the third term prior to graduation.

Plan II may be followed in two ways in a 134-hour degree program:

A. Independent study (6 hours — Art 490, 491) in the candidate’s specialty, leading to a one-man exhibition or the presentation of a research paper at a seminar meeting in the last term of the senior year; 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 I: Prehistoric through Roman Art 3 hrs.
A survey of the architecture, painting, sculpture and decorative arts of the
ancient world considered in relation to the environment in which they were produced.

101 Art History Survey II: Early Christian through Rococo Art
A survey of the art and architecture of the Western World from the 1st century A.D. to the 19th century examined in the light of social change and of the emergence of the artist as an individual.

109 Introduction to Criticism and Appreciation of Art; Aesthetics in the Visual Arts
Introduction to basic aspects of and factors in criticism and appreciation of art, including an introduction to phenomenological aesthetics. Exploration of avenues of appreciation open to and used by individuals of varying backgrounds. A brief review of art movements of the 19th and 20th centuries in relation to pertinent influences in the environment as modified or structured by individual creativity. Not applicable to art history requirements for studio specialties.

120 Two-Dimensional Form in Design
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
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 Material
Introduction in clay to three-dimensional sculptural space and practice in mold-making and casting techniques and the use of hydrocal materials as a constructive material.

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

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

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

162 Drawing Light-On-Dark Media
Introduction to the use of light in drawing, especially useful in preparation for oil paintings.

163 Drawing with Collage
Introduction to drawing systems that involve assembling performed visual references.

165 Photography for Drawing and Design
The understanding and practice of photography through its use as a drawing and design medium. Students are not required to own photographic equipment. Required for all studio art majors.
197 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.

215 Art for Elementary Teachers 3 hrs.
Introduction to art structure and art appreciation and to potential uses of art media for elementary school teachers. Through a combination of illustrated lectures, demonstrations, guided discussions, reference reading, and studio experience those areas of art most significant for the elementary teacher are explored. Consideration is given to some of the ways in which creative use can be made of contemporary art and audio-visual media that provide enrichment opportunities for elementary school children.

Upper Division

300 Historical Survey of American Art 3 hrs.
A survey of the visual arts in America from the Colonial Period to the present, with consideration of the changes in the status of the visual arts in American culture in successive periods. In connection with architecture, prototypes that have influenced American building forms and furnishings are reviewed. Prerequisite: Art 100 or 101 or approval of instructor.

301 Historical Survey of Classical Art 3 hrs.
A survey of the developmental changes in the visual arts in Greece and the Roman Empire and the cultural interrelationship involved. Examples are presented on the influence of classical art on later art forms in Europe and America. Prerequisite: Art 100 or 101 or approval of instructor.

302 Historical Survey of Medieval Art 3 hrs.
A survey of the architecture, sculpture, and decorative arts, including manuscript illustration of the Middle Ages in relation to the environmental cultures in which these arts evolved. Prerequisite: Art 100 or 101 or approval of instructor.

303 Historical Survey of Renaissance Art 3 hrs.
A survey of the visual arts of the Renaissance in Italy and Europe. The emergence of the artists as a creative personality and the role of the visual arts in the development of Renaissance civilization. Renaissance sources of art forms used in later centuries. Prerequisite: Art 100, 101 or approval of instructor.

304 Historical Survey of Contemporary Art 3 hrs.
A survey of the visual arts in the 20th century and their 19th century antecedents. Implications of the Cultural Explosion of the middle decades of the current century. The changing role of the artist in contemporary society. New concepts of media and relation to environment in the arts of today. Prerequisite: Art 100 or 101 or 109 or approval of instructor.

The art and culture of Japan and the sources of these developments from China and India or transmitted via Korea. The developing dichotomy of ancient traditions and modern technology and life in Japan. Contemporary art developments tempered by pervading heritage of artistry and design consciousness. Prerequisite: Art 100 or 101 or 109 or approval of instructor.
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>309</td>
<td>Period Styles in Interior Design</td>
<td>3 hrs.</td>
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<td></td>
<td>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. Design principles that provide a basis for selecting furnishings are presented.</td>
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<td>310</td>
<td>Historical Survey of 19th and Early 20th Century Art</td>
<td>3 hrs.</td>
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<td>A survey of art and architecture from the Romantic period to the present, examining the developments and concepts that have led to the modern movements in art.</td>
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<td>330</td>
<td>Fundamentals of Advertising Design</td>
<td>2 hrs.</td>
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<td>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: ARH 100 or 101, ARS 120 or 121, or approval of instructor.</td>
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<td>331</td>
<td>Advertising Layout and Typographic Design</td>
<td>2 hrs.</td>
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<td>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: ARH 100 or 101, ARS 120 or 121, or approval of instructor.</td>
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<tr>
<td>332</td>
<td>Illustration</td>
<td>2 hrs.</td>
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<td>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: ARH 100 or 101, ARS 120 or 121, 197, or approval of instructor.</td>
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<td>340</td>
<td>Sculptural Use of the Thermoset Plastics</td>
<td>2 hrs.</td>
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<td></td>
<td>Sculptural manipulation of thermoset resins and foams. Prerequisite: Art 101, 140, or approval of instructor.</td>
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<tr>
<td>341</td>
<td>Sculptural Use of the Thermoplastics</td>
<td>2 hrs.</td>
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<td>Manipulation of thermoplastics by bonding, dying, forming, and welding. Prerequisite: Art 101, 140, 141, or approval of instructor.</td>
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<td>342</td>
<td>Casting Metal</td>
<td>2 hrs.</td>
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<td>Foundry work in wax and sand casting of bronze and aluminum. Prerequisite: Art 100 or 101, 140, 141, or approval of instructor.</td>
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<tr>
<td>343</td>
<td>Sculpture Workshop</td>
<td>2 hrs.</td>
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<td>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. Counts as one of the three junior level courses required for the major specialty in sculpture. Prerequisite: ARH 100 or 101, 140 and 141, and one or more of the 300 level courses in sculpture (or equivalent) and approval of instructor.</td>
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<tr>
<td>370</td>
<td>Oil Painting</td>
<td>2 hrs.</td>
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<tr>
<td></td>
<td>An advanced course dealing with the fluid nature and brilliance of oil</td>
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paints. Prerequisite: Art 100 or 101; one of Art 120, 121; and one of Art 160, 161, 162, 163 or approval of instructor.

371 Tempera Painting 2 hrs.
Advanced studio experience in traditional and synthetic tempera media.
Prerequisite: Art 100 or 101; one of Art 120, or 121; and one of Art 160, 161, 162, 163, or approval of instructor.

372 Mixed Media 2 hrs.
Advanced experience in the combination of formerly separate media and motifs: for example, two and three-dimensional form, cut-out form, movies, psychedelia, kinetics, sound, environments, events, etc. Prerequisite: Art 100 or 101; one of Art 120, 121; and one of Art 160, 161, 162, 163 or approval of instructor.

373 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.

380 Graphics: Intaglio Printmaking 2 hrs.
Beginning studio practice in etching and engraving. Prerequisite: Art 100 or 101, 121; and one of Art 160, 161, 162, 163, or approval of instructor.

381 Graphics: Planographic Printmaking 2 hrs.
Beginning studio practice in lithography. Prerequisite: Art 100 or 101; and one of Art 160, 161, 162, 163 or approval of instructor.

382 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: ARH 100 or 101, ARS 120 or 121, one of ARS 160, 161, 162, 163, 197 or approval of instructor.

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 ARH 100 or 101; 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.

400 Art History Seminar: Renaissance and Baroque 3 hrs.
Initial survey of Baroque developments in relation to Renaissance art forms. Discussion and guided research on artists, works of art, and related cultural changes in these periods. A research paper is developed by each participant. Prerequisite: Art 100 or 101, 303, junior standing, and approval of instructor.

401 Art History Seminar: Modern Art 3 hrs.
Discussion and guided research on the visual arts of the late 19th and 20th centuries. A research paper is developed by each participant. Prerequisite: Art 100, 101, or 109, 304; junior standing; and approval of instructor.
402 Art History Seminar: American Art 3 hrs.
Discussion and guided research on the visual arts in America from the Colonial Period to the present. Research papers are developed during the term. Prerequisite: Art 100, or 101 or 109, and 300; at least junior standing; and approval of instructor.

430 Advanced Studio Problems in Communication Graphics 2 hrs.
Individual content by consultation. Prerequisite: senior standing.

431 Advanced Studio Problems in Communication Graphics 2 hrs.
Individual content by consultation. Prerequisite: senior standing.

432 Advanced Studio Problems in Communication Graphics 2 hrs.
Individual content by consultation. Prerequisite: senior standing.

440 Advanced Studio Problems in Sculpture 2 hrs.
Individual content by consultation. Prerequisite: senior standing.

441 Advanced Studio Problems in Sculpture 2 hrs.
Individual content by consultation. Prerequisite: senior standing.

442 Advanced Studio Problems in Sculpture 2 hrs.
Individual content by consultation. Prerequisite: senior standing.

470 Advanced Studio Problems in Painting 2 hrs.
Individual content by consultation. Prerequisite: senior standing.

471 Advanced Studio Problems in Painting 2 hrs.
Individual content by consultation. Prerequisite: senior standing.

472 Advanced Studio Problems in Painting 2 hrs.
Individual content by consultation. Prerequisite: senior standing.

490 Independent Study 3 hrs.
Independent study in art history or in the candidate's studio specialty leading to presentation of research paper at a seminar meeting or a one-man exhibition in the last term of the senior year. Arrangements for independent study must be completed within the third term prior to graduation following recommendation by an art faculty member and the approval of the department chairman.

491 Independent Study 3 hrs.
Independent study in art history or in the candidate’s studio specialty leading to presentation of a research paper at a seminar meeting or a one-man exhibition in the last term of the senior year. Arrangements for independent study must be completed within the third term prior to graduation following recommendation by an art faculty member and the approval of the department chairman.

495 Technical Problems 1-2 hrs.
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.
500 Special Problems in Art History 1-3 hrs.
Directed reading and documented research. Prerequisite: advanced standing, twelve hours of art history, previous course work in the area to be studied, and prior approval of instructor.

Business Administration

Professors: Bucher (chairman), Graves, Traylor; Assistant Professors: Cloud, 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 science, accounting, or finance.

A student majoring in another discipline who is interested in a business administration cluster may choose a minimum of 21 semester hours in courses from one of the major options (accounting, finance, or management) of which a minimum of 6 hours must be courses numbered 300 or above.

Students may request permission to attend classes at Alabama A&M University or one of the other institutions participating in the Visiting Student Program (see pertinent paragraph under Academic Information).

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 (major of cluster) are omitted in calculating the maximum of 64 hours in the AOC.

General Education Requirements

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUMANITIES AND BEHAVIORAL SCIENCES</td>
</tr>
<tr>
<td>English Composition</td>
</tr>
<tr>
<td>Survey of English Literature</td>
</tr>
</tbody>
</table>
Origin and Development of the Contemporary World 6
Economics, Philosophy, Political Science, Psychology or Sociology — one discipline 6

NATURAL SCIENCES
Biology, Chemistry, or Physics 8

MATHEMATICS
MA 105, 133, 153 (or demonstrated competency through 153) 9

LANGUAGES
A student may choose one of the following options: 12
(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, EC 325
   (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>Semester Hours</th>
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</thead>
<tbody>
<tr>
<td>Semester</td>
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<tr>
<td></td>
</tr>
<tr>
<td>AC 111</td>
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<tr>
<td>CS 113</td>
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<tr>
<td>EC 142</td>
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<tr>
<td>EC 143</td>
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<tr>
<td>BUS 231</td>
</tr>
<tr>
<td>FIN 251</td>
</tr>
<tr>
<td>BUS 420</td>
</tr>
</tbody>
</table>

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Additional Requirements for each major option are as follows:

ACCOUNTING (AC)
AC 112 Principles of Accounting II 3
AC 213 Intermediate Accounting I 3
AC 214 Intermediate Accounting II 3
Choice of one of three
   AC 313 Income Tax Procedure
   AC 314 Cost Accounting
   AC 315 Introduction to Auditing
BUS 325  Intermediate Economic and Business Statistics  3
Choice of one of two  3
   MGT 300  Quantitative Methods in Management
   EG 525  Operations Research I
AC 415  Advanced Accounting I  3
AC 416  Advanced Accounting II  3

FINANCE (FIN)
AC 112  Principles of Accounting II  3
MGT 200  Essentials of Management  3
Choice of one of two:  3
   EC 340  Macro Economic Analysis
   EC 345  Micro Economic Analysis
FIN 352  Money and Banking  3
FIN 505  Investments  3
Choice of one of two  3
   FIN 353  Public Finance
   FIN 452  State and Local Finance
MGT 361  Management Practices in Business Organizations  3
MGT 531  Managerial Finance  3

MANAGEMENT SCIENCE (MGT)
MGT 200  Essentials of Management  3
MGT 220  Industrial Management  3
MGT 262  Management and Labor Economics  3
BUS 325  Intermediate Economic and Business Statistics  3
MGT 300  Quantitative Methods in Management  3
MGT 361  Management Practices in Business Organization  3
EC 345  Micro Economic Analysis  3
Choice of any 400 or 500 level MGT or BUS course not included above  3

Area of Concentration — Cluster

A student may form a supportive cluster of 21 hours drawn from one or more disciplines or from one of several job-related certificate programs. Disciplines which have a particularly supportive and synergistic potential as clusters include economics, computer science, industrial and systems engineering, mathematics, political science, sociology, and psychology. Job certificate programs in industrial administration, logistics technology, public administration, and techni-
cal management are currently available and programs in contract administration and logistics management are under development.

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 in courses from one of the major options (accounting, finance, or management), of which a minimum of 6 hours must be courses numbered 300 or above.

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 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 EC 311 and CS 311.

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

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: BUS 231. Same as EC 325.

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: BUS 311. Same as EC 411 and CS 411.

420 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)

111 Principles of Accounting I  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.

112 Principles of Accounting II  3 hrs.
Managerial (internal) accounting is introduced with the emphasis on the flow of responsibility in a corporation, cost control—standard costs and cost behavior—performance measurement for service, product—handling, and manufacturing entities, planning alternate courses of operations, and planning the acquisition of facilities. Prerequisite: AC 111.

213 Intermediate Accounting I  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 112.

214 Intermediate Accounting II  3 hrs.
Theoretical analysis of present-day accounting practice with particular regard to cost approach; income tax implications in measuring financial position; going—concern assumption; practices of conservatism and consistency and full disclosure; examination of analytical processes of statement preparation including funds—flow and cash—flow reporting in financial statements adjusted for price—level changes. Prerequisite: AC 213.

313 Income Tax Procedure  3 hrs.
Determination of taxable income and selected aspects of tax accounting for individuals. Prerequisite: AC 112.

314 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 213.

315 Introduction to Auditing  3 hrs.
Auditing theory and practice, working papers, financial statements, and professional ethics. Prerequisite: AC 214.

415 Advanced Accounting I  3 hrs.
Treatment of recent developments in accounting thought; advanced techniques of partnership accounting; venture accounting; assignments; installment sales, statement of affairs, realization and liquidation reports, accounting applications of compound interest and annuities; estates and trusts. Prerequisite: AC 214.

416 Advanced Accounting II  3 hrs.
Extended examination of home office and branch accounting; parent and
subsidiary accounting (consolidated statements); public and foreign accounts. Prerequisite: AC 214.

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 416.

500 CPA Review 3 hrs.
A review course for the advanced accounting student covering general and specialized accounting problems, theory, law, taxation, auditing, and related subjects which constitute the subject matter of the CPA examination. Permission of instructor required.

Management (MGT)

200 Essentials of Management 3 hrs.
The elements of the managerial process that are fundamental to the successful operation of various types of enterprises.

220 Industrial 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. Same as EG 220.

262 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. Same as BUS 262.

300 Introduction to Quantitative Methods in Management 3 hrs.
An introduction to the use of quantitative methods in solving business problems and improving decision making. Prerequisite: MA 153, BUS 231; MGT 200 is recommended but not required.

Examination of current management practices with the business organization as a model. Management functional processes, social and behavioral issues and problems, and selected actual or text cases are the areas of emphasis to determine how management makes business decisions. Prerequisite: MGT 200 or MGT 262. Same as BUS 361.

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. Same as BUS 363.

420 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. Same as BUS 420.
427 Management Systems Analysis 3 hrs.
A system approach to the study of formal organizations. Presents analytical techniques for making decisions about organizational design. Prerequisite: EG 220, EG 390. Same as EG 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. Same as BUS 450.

Graduate and Undergraduate Credit

531 Managerial Finance 3 hrs.
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. Prerequisite: MGT 200, FIN 261, FIN (EC) 352. Same as FIN 531.

561 Managerial Economics 3 hrs.
Analysis of managerial concepts from the multiple fields of business administration, quantitative and qualitative decision methods including case problems related to the process of economic decision-making and to the formulation of policy at the top level of the firm. Prerequisite: EC 345.

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

Finance (FIN)

251 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.

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 EC 452.

Graduate and Undergraduate Credit

531 Managerial Finance 3 hrs.
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. Prerequisite: MGT 200, FIN 251. Same as MGT 531.

554 International Finance 3 hrs.
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 3 hrs.
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.

Communication

The Communication Committee develops courses and programs in the communication arts, including speech. These courses are offered as electives in the School of Humanities and Behavioral Sciences. Speech 110, 113, or 114 will satisfy requirements for teacher certification.

Communication (CM)

201 Journalism I 3 hrs.

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.

Speech (SP)

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

113 Public Speaking 3 hrs.
Study and practice of the forms and methods of rhetorical communication.

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

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

118 Play Production 3 hrs.
Study and practice in the methods of producing a play.

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

UAH has developed an undergraduate degree program that is designed to help meet the criminal justice system’s critical need for well-educated professionals to fill a variety of important positions. The program is sufficiently flexible to benefit persons throughout the system. However, an emphasis has been placed on needs in police functions.

Although the program has a substantial number of professional law enforcement courses, the primary objective is to provide a general education. Today’s law enforcement personnel must constantly deal with problems resulting from population growth, increasing urbanization, developing technology, civil rights revolution, and breakdown of traditional values. He must be aware of these factors and must understand the psychological and sociological implications for his community. He must deal with all of its citizens — rich and poor, young and old, of whatever cultural and ethnic backgrounds — in a manner which will maintain their confidence and support. The UAH program is designed to provide these objectives.

The program, leading to a Bachelor of Arts degree, involves an Area of Concentration (AOC) with a major in the social and behavioral sciences and a cluster in law enforcement. The curriculum includes PSC 101, SOC 100, and PY 103 as foundation courses which also satisfy a portion of the General Education Requirements. An additional 33 semester hours in courses, approved by the student’s advisor, are selected from disciplines in the social and behavioral sciences to complete an interdisciplinary major in criminal justice. This major must include at least 15 semester hours in courses numbered 300 and above. Requirements for the cluster must be met with 21 semester hours in law enforcement (LE) courses, including 6 semester hours in courses numbered 300 and above. Additional courses in the General Education Requirements and approximately 21 semester hours in electives complete the curriculum.

Law Enforcement courses are listed under course offerings of the Division of Continuous Education.

Developmental Learning

Associate Professors: Tarter, Wharry (chairman); Assistant Professors: Butts, James, 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 9 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 251 of this catalog.

**Developmental Learning (DL)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>593</td>
<td>Education of Exceptional Children and Youth</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>601</td>
<td>Early Childhood Development</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>602</td>
<td>Psychopathology of Children With Learning Problems</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>603</td>
<td>Sensory-Motor Readiness In Children</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>604</td>
<td>Adaptive Academics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>605</td>
<td>Curriculum For Early Childhood Education</td>
<td>3 hrs.</td>
</tr>
</tbody>
</table>
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**  
3 hrs.  
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.

631  **Diagnostic Procedures: Stanford-Binet**  
3 hrs.  
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.

632 Diagnostic Procedures: Wechsler 3 hrs.
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.

640 The Family In A Changing Society 3 hrs.
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 3 hrs.
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 3 hrs.
Supervised readings in depth in an area of particular interest to the student. Prerequisite: approval of instructor.

650 Practicum 3 hrs.
Provides both group and clinical experiences in working with children's learning patterns and deviations on an individual basis.

799 Master's Thesis 6 hrs.

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>Semester Hours</th>
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</thead>
<tbody>
<tr>
<td>EC 231 Applied Statistics for Social and Behavioral Sciences</td>
</tr>
<tr>
<td>EC 241 Marketing Economics</td>
</tr>
</tbody>
</table>

106
EC 310 Introduction to the use of Mathematics in Economics 3
EC 325 Intermediate Statistics 3
EC 340 Macro Economic Analysis 3
EC 341 History of American Economic Growth 3
EC 345 Micro Economic Analysis 3
EC 352 Money and Banking 3
EC 430 Introduction to Econometrics 3
EC 460 Problems in Economics 3
EC 448 Development of Economic Theory 3
EC 546 International Economics and Trade 3
EC 585 Comparative Economic Systems 3

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

AC 111 Principles of Accounting 3
MGT 200 Principles of Management 3
EC 231 Applied Statistics for Social and Behavioral Sciences 3
EC 241 Marketing Economics 3
EC 310 Introduction to the use of Mathematics in Economics 3
EC 325 Intermediate Statistics 3
EC 340 Macro Economic Analysis 3
EC 341 History of American Economic Growth 3
EC 345 Micro Economic Analysis 3
EC 352 Money and Banking 3
EC 448 Development of Economic Theory 3
MGT 561 Managerial Economics 3
BUS 420 Business Policy 3

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

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

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</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>EC 142  Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>EC 143  Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>EC 231  Applied Statistics for Social and Behavioral Sciences</td>
<td>3</td>
</tr>
<tr>
<td>EC 352  Money and Banking</td>
<td>3</td>
</tr>
<tr>
<td>And any three of the following four courses:</td>
<td></td>
</tr>
<tr>
<td>EC 340  Macro Economic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EC 341  History of American Economic Growth</td>
<td>3</td>
</tr>
<tr>
<td>EC 345  Micro Economic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EC 448  Development of Economic Theory</td>
<td>3</td>
</tr>
</tbody>
</table>

With Mathematics

| EC 142  Principles of Economics | 3 |
| EC 143  Principles of Economics | 3 |
| EC 231  Applied Statistics for Social and Behavioral Sciences | 3 |
| EC 352  Money and Banking | 3 |
| And any three of the following four courses: | |
| EC 340  Macro Economic Analysis | 3 |
| EC 341  History of American Economic Growth | 3 |
| EC 345  Micro Economic Analysis | 3 |
| EC 448  Development of Economic Theory | 3 |

With History

| EC 142  Principles of Economics | 3 |
| EC 143  Principles of Economics | 3 |
| EC 322  Public Policy Toward Business | 3 |
| EC 341  History of American Economic Growth | 3 |
| EC 344  European Economic History | 3 |
| EC 510  Survey of Economic Theory | 3 |
| EC 585  Comparative Economic Systems | 3 |

With Psychology

| EC 142  Principles of Economics | 3 |
| EC 143  Principles of Economics | 3 |
| EC 241  Marketing Economics | 3 |
| EC 322  Public Policy Toward Business | 3 |
| EC 325  Intermediate Statistics | 3 |
| EC 341  History of American Economic Growth | 3 |
| EC 510  Survey of Economic Theory | 3 |
| EC 585  Comparative Economic Systems | 3 |

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.

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.

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 Macro Economic 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 Micro Economic 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
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
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.

514 Analog Computation and Problems in Economics
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 510 and approval of instructor. Same as CS 514.

546 International Economics and Trade
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
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
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
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
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

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>
</tr>
</thead>
<tbody>
<tr>
<td>HUMANITIES &amp; BEHAVIORAL SCIENCES</td>
</tr>
</tbody>
</table>

Survey of English Literature (EH 205–206) 6
Speech (SP 110, 113 or 114) 3
Origins and Development of the Contemporary World (HY 101–102 or 391–392) 6
Art for the Elementary Teacher (ART 215) 3
Music for the Elementary Teacher (MU 215) 3
Physical Education for the Elementary Teacher (ED 215) 3
Modern Foreign Language (One language) 6–12
Economics, Political Science or Sociology (6 hours from one discipline) 6
Economics, History, Political Science or Sociology (a minimum of 3 hours in a discipline other than history and the one chosen above) 6
Psychology (PY 103) 3

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 (excluding environmental sciences)
   4 hours in the second area (including ES 101 or 102)
   3 hours in mathematics 12
2. 12 hours natural science (NS 111, 112, 113)
   3 hours in mathematics 15

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

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</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Professional Course:</td>
<td></td>
</tr>
<tr>
<td>Human Development (ED 230)</td>
<td>3</td>
</tr>
</tbody>
</table>
Foundations of Education in the U.S. (ED 261)  
Educational Psychology (ED 263)  
Group Processes (ED 265-266)  

Professional Courses:  
(Students must be admitted to the Teacher Education Program to enroll in the following courses.)  
Diagnostic and Prescriptive Teaching (ED 360)  
Group Processes (ED 367)  

Select one of the following courses:  
Language Arts for the Early Elementary Grades, 1-3, (ED 370)  
Language Arts for the Later Elementary Grades, 4-6, (ED 371)  

Select two of the following courses outside of the major:  
Teaching the Social Studies (ED 372)  
Teaching the Natural Sciences (ED 373)  
Teaching the Arithmetic (ED 374)  

Student Teaching in the Elementary School (ED 491)  

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

<table>
<thead>
<tr>
<th>Humanities &amp; Behavioral Sciences</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Composition (EH 101-102 or 103-104)</td>
<td>6</td>
</tr>
<tr>
<td>Survey of English Literature (EH 205-206)</td>
<td>6</td>
</tr>
<tr>
<td>Speech (EH 110, 113 or 114)</td>
<td>3</td>
</tr>
</tbody>
</table>

115
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 (excluding environmental sciences)
   4 hours in the second area (including ES 101 or 102)
   3 hours in mathematics 12
2. 12 hours natural science (NS 111, 112, 113)
   3 hours in mathematics 12

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

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. 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

<table>
<thead>
<tr>
<th>Professional Education Courses</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED 261 Foundations of Education in the United States</td>
<td>3</td>
</tr>
<tr>
<td>ED 263 Educational Psychology</td>
<td>3</td>
</tr>
<tr>
<td>ED 388 Teaching Secondary School Subjects</td>
<td>3</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>ED 490</td>
<td>Principles of High School Teaching</td>
</tr>
<tr>
<td>ED 497</td>
<td>Secondary Student Teaching</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.

**Education (ED)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>111</td>
<td>Career Exploration</td>
<td>1 hr.</td>
</tr>
<tr>
<td></td>
<td>Educational and Vocational Planning. Prerequisite: 9 hours college credit and placement tests.</td>
<td></td>
</tr>
<tr>
<td>261</td>
<td>Foundations of Education in the United States</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>The development of education in America and its relation to prospective teachers. Prerequisite: sophomore standing.</td>
<td></td>
</tr>
<tr>
<td>263</td>
<td>Educational Psychology</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Psychological principles basic to an understanding of the learner, the learning process, and the learning situation. Prerequisite: PY 103 and sophomore standing.</td>
<td></td>
</tr>
<tr>
<td>325</td>
<td>The Sociology of Education</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>411</td>
<td>Guidance for Teachers</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>The sociological, psychological, and philosophical bases for guidance in schools.</td>
<td></td>
</tr>
<tr>
<td>456</td>
<td>Mental Health in the School</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Dynamics of behavior, the recognition of minor maladjustments, the criteria for referral, and classroom practices supporting good mental health. Prerequisite: ED 263 or equivalent and junior standing.</td>
<td></td>
</tr>
<tr>
<td>467</td>
<td>Tests and Measurements</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Survey of standardized and teacher-made evaluation instruments.</td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>Special Problems in Education</td>
<td>1-3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Independent study. Prerequisite: senior standing.</td>
<td></td>
</tr>
<tr>
<td>549</td>
<td>Audio-Visual Instruction</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Audio-visual media in teaching, the selection, use, and maintenance of audio-visual materials in educational programs. Open only to students in teacher-education curricula.</td>
<td></td>
</tr>
</tbody>
</table>

**Elementary Education**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>215</td>
<td>Physical Education for the Elementary Teacher</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Designed to give a basic understanding of body alignment, developmental exercises and movement exploration activities for physical education in the elementary grades. Additionally, there will be study of student needs to provide proper equipment, facilities, and leadership for the overall program.</td>
<td></td>
</tr>
</tbody>
</table>
230 Human Development 3 hrs.
Overview of human development from conception to adulthood. Continuity stressed. 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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>491</td>
<td>Student Teaching in the Elementary School</td>
<td>6 hrs.</td>
</tr>
<tr>
<td></td>
<td>Teaching experience in local elementary schools under supervision. Concurrent conferences to be arranged as needed.</td>
<td></td>
</tr>
<tr>
<td>492</td>
<td>Observation and Participation in Teaching</td>
<td>3–6 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
</tbody>
</table>

**Secondary Education**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>388</td>
<td>Teaching Secondary School Subjects</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>(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.</td>
<td></td>
</tr>
<tr>
<td>490</td>
<td>Principles of High School Teaching</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: ED 388 and senior standing. This course is taken concurrently with student teaching.</td>
<td></td>
</tr>
<tr>
<td>497</td>
<td>Secondary Student Teaching</td>
<td>9 hrs.</td>
</tr>
<tr>
<td></td>
<td>(Major area of teaching to be designated.) Observation and student teaching in secondary schools. Prerequisite: ED 388 and senior standing.</td>
<td></td>
</tr>
<tr>
<td>498</td>
<td>Observation and Participation in Teaching</td>
<td>3–6 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
</tbody>
</table>

**Special Education**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>495</td>
<td>Psychology and Education of the Mentally Retarded I</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Social, emotional, physical, and learning characteristics of retarded children and youth. Prerequisite: ED 263.</td>
<td></td>
</tr>
<tr>
<td>496</td>
<td>Psychology and Education of the Mentally Retarded II</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Continuation of ED 495 with emphasis upon educational organization and teaching techniques. Prerequisite: ED 495 recommended.</td>
<td></td>
</tr>
<tr>
<td>593</td>
<td>Education of Exceptional Children and Youth</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Introduction to the field of exceptional children and youth. Prerequisite: ED 263.</td>
<td></td>
</tr>
</tbody>
</table>

**Librarianship**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Introduction to Libraries and Bibliography</td>
<td>2 hrs.</td>
</tr>
<tr>
<td></td>
<td>Systems of library retrieval and their use; construction of bibliographies and footnotes; library resources of the area.</td>
<td></td>
</tr>
<tr>
<td>380</td>
<td>Library Operation and Management</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Methods of organizing books and other library materials; includes ordering, processing, circulating, mending, binding, inventory, budgeting, business records, housing, and equipment.</td>
<td></td>
</tr>
</tbody>
</table>
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.

588 Books for Young People 3 hrs.
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 103. 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

703 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.

711 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.

722 Modern Elementary School Programs 3 hrs.
Evaluating new patterns of organization and the developing curriculum in the elementary school.

730 Modern Secondary School Programs 3 hrs.
Survey of important viewpoints and issues, re-organization trends, typical research findings by subject fields and analysis of current curriculum proposals at the national, state, and local levels.

733 Public School Organization and Administration 3 hrs.
A systematic treatment of the problems of administration local, state and national. 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.

763 Contributions of Psychology to Education 3 hrs.
Principles, theory, and practice of psychology for teaching and adminis-
trative 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.

791 Principles of Curriculum Development 3 hrs.
Principles of curriculum construction which underlie the re-organization
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.

English

Professors: Francis, Hutchens, Martin, Welker (chairman), Woodard;
Assistant Professors: Conover, Harrison, Kiser; Instructors: Allen,
Dillard, Fincher, Wikle.

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</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic courses (EH 101-102 or 103-104 and EH 205-206)</td>
<td>12</td>
</tr>
<tr>
<td>Shakespeare (EH 360)</td>
<td>3</td>
</tr>
<tr>
<td>American Literature (EH 330, 331, 430*, 431*, 432, 530)</td>
<td>3</td>
</tr>
<tr>
<td>I Middle Ages and Renaissance (EH 450, 460, 471)</td>
<td>3</td>
</tr>
<tr>
<td>II Restoration and 18th Century (EH 380, 381, 470, 492*)</td>
<td>3</td>
</tr>
<tr>
<td>III 19th Century (EH 390, 391, 493*)</td>
<td>3</td>
</tr>
<tr>
<td>IV Modern Literature (EH 420, 421, 500)</td>
<td>3</td>
</tr>
<tr>
<td>Electives in English</td>
<td>6–16</td>
</tr>
<tr>
<td></td>
<td>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 include 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 social 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>Total</td>
</tr>
</tbody>
</table>

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.

English (EH)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>003</td>
<td>Remedial Writing</td>
<td>No credit</td>
<td>Required of students whose placement test score or class performance indicates the need of remedial work.</td>
</tr>
<tr>
<td>101</td>
<td>Freshman Composition</td>
<td>3 hrs.</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>
</tr>
<tr>
<td>102</td>
<td>Freshman Composition</td>
<td>3 hrs.</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>
</tr>
</tbody>
</table>
103 Advanced Freshman Composition 3 hrs.
Similar to, but more intensive than EH 101. Required of and open only to
students whose placement test score indicates superior ability. Prerequisite:
placement.

104 Advanced Freshman Composition 3 hrs.
Similar to, but more intensive than EH 102. Prerequisite: EH 103.

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

205 Survey of English Literature 3 hrs.
Anglo-Saxon literature through Milton. Prerequisite: EH 101 and 102 or
103 and 104.

206 Survey of English Literature 3 hrs.
Restoration through 20th century. Prerequisite: EH 205.

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

207 Modern English Grammar 3 hrs.
Study of traditional grammar, with introduction to structural grammar and
linguistics.

208 History of the English Language 3 hrs.
Survey of the morphological, syntactic, and lexical development of the
English language, with emphasis on the structure of the present-day English.
Prerequisite: EH 205.

210 Fiction Writing 3 hrs.
Practice in writing of fiction, from conception to revision. Approval of
instructor.

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

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

242 Classical Mythology 3 hrs.
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.

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

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

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

380 Restoration and Early 18th Century 3 hrs.
Dryden, Swift, Pope, and others.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>381</td>
<td>Later 18th Century</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Johnson, Boswell, and others.</td>
<td></td>
</tr>
<tr>
<td>390</td>
<td>The Romantic Period</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Poetry and non-fictional prose, 1780-1832.</td>
<td></td>
</tr>
<tr>
<td>391</td>
<td>The Victorian Period</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Poetry and non-fictional prose, 1832-1901.</td>
<td></td>
</tr>
</tbody>
</table>

Courses below are open to students who have completed 18 semester hours in English.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>420</td>
<td>Modern Poetry</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Major movements in American and British poetry of the 20th century.</td>
<td></td>
</tr>
<tr>
<td>421</td>
<td>Modern Drama</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>A study of the major ideas and forces which originated new movements in drama from Ibsen to the present.</td>
<td></td>
</tr>
<tr>
<td>430</td>
<td>The American Novel</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Theme and form of the American novel from Cooper to James.</td>
<td></td>
</tr>
<tr>
<td>431</td>
<td>The American Novel</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Representative works from the school of naturalism to the present.</td>
<td></td>
</tr>
<tr>
<td>432</td>
<td>The Southern Renaissance</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Origin and development of Southern myth with particular emphasis on major writers of the Southern Renaissance.</td>
<td></td>
</tr>
<tr>
<td>450</td>
<td>Chaucer</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Emphasis on Canterbury Tales andTroilus and Criseyde in middle English.</td>
<td></td>
</tr>
<tr>
<td>460</td>
<td>Renaissance Non-Dramatic Poetry</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Renaissance poetry exclusive of Shakespeare and Milton.</td>
<td></td>
</tr>
<tr>
<td>470</td>
<td>Milton and the 17th Century</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Milton, cavalier and metaphysical poetry, and selected prose.</td>
<td></td>
</tr>
<tr>
<td>471</td>
<td>English Drama</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>From its beginnings to 1642, exclusive of Shakespeare.</td>
<td></td>
</tr>
<tr>
<td>492</td>
<td>The English Novel</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Critical reading of representative novels, accompanied by historical survey of major trends. Fielding to Thackeray.</td>
<td></td>
</tr>
<tr>
<td>493</td>
<td>The English Novel</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Critical reading of representative novels, accompanied by historical survey of major trends. George Eliot to present.</td>
<td></td>
</tr>
</tbody>
</table>

Courses below are open to students who have completed 24 semester hours of English.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>Literary Criticism</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Major theories and methods, with applications by the student.</td>
<td></td>
</tr>
</tbody>
</table>
530 American Literature Seminar 3 hrs.
Intensive study of one or more writers, groups, or movements, announced in advance.

540 English Literature Seminar 3 hrs.
Intensive study of one or more writers, groups, or movements, announced in advance.

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 (HPE 140). 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)

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>1 hr.</td>
</tr>
<tr>
<td>101 Body Conditioning for Women</td>
<td>1 hr.</td>
</tr>
<tr>
<td>102 Beginning Tennis</td>
<td>1 hr.</td>
</tr>
<tr>
<td>103 Beginning Golf</td>
<td>1 hr.</td>
</tr>
<tr>
<td>104 Basketball</td>
<td>1 hr.</td>
</tr>
<tr>
<td>105 Volleyball</td>
<td>1 hr.</td>
</tr>
<tr>
<td>107 Folk and Square Dance</td>
<td>1 hr.</td>
</tr>
<tr>
<td>140 Varsity Sports</td>
<td>1 hr.</td>
</tr>
<tr>
<td>150 Contemporary Medicine and the Young Adult</td>
<td>3 hrs.</td>
</tr>
</tbody>
</table>

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.

History

Professors: Roberts; Associate Professors: Salley, White (chairman); Assistant Professors: Eastby, 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 24 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 3 hrs.
A general survey of the major western civilizations to 1648. Not open to seniors.

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

102 Origins and Development of the Contemporary World, Part II
   T (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 impor­
tance 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.

392 Europe Since 1815 3 hrs.
A study of Europe from the end of the Napoleonic Wars to the present with equal emphasis on the nineteenth and twentieth centuries. Prerequisite: HY 391 or approval of instructor.

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

401 Problems in American Studies 3 hrs.
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, 222.

413 The Nineteenth Century South 3 hrs.
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.

414 The South in the Twentieth Century 3 hrs.
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.

418 Constitutional History of the United States 3 hrs.
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.

424 Colonial America to 1789 3 hrs.
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.

425 The Emergence of the United States as a New Nation 3 hrs.
An intensive study of the Revolutionary Era, the period of the Confederation and the development of the Young Republic.

439 Problems in American Foreign Relations Since 1939 3 hrs.
An intensive study of selected problems in the light of ideological conflicts, domestic factors and the national interest. Same as PSC 439.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>446</td>
<td>The Relations of the United States and the Far East</td>
<td>3 hrs.</td>
<td>HY 221, 222, or approval of instructor.</td>
</tr>
<tr>
<td>473</td>
<td>The High Middle Ages, C. 1000-1300</td>
<td>3 hrs.</td>
<td>HY 391 or approval of instructor.</td>
</tr>
<tr>
<td>475</td>
<td>Europe in the Seventeenth Century</td>
<td>3 hrs.</td>
<td>HY 391 or approval of instructor.</td>
</tr>
<tr>
<td>477</td>
<td>The French Revolution and Napoleon, 1789–1815.</td>
<td>3 hrs.</td>
<td></td>
</tr>
<tr>
<td>528</td>
<td>Jeffersonian-Jacksonian America</td>
<td>3 hrs.</td>
<td>HY 221, 222, or approval of instructor.</td>
</tr>
<tr>
<td>534</td>
<td>The Civil War and Reconstruction</td>
<td>3 hrs.</td>
<td>HY 221, 222, or approval of instructor.</td>
</tr>
<tr>
<td>537</td>
<td>The Foundations of Modern America, 1865-1914</td>
<td>3 hrs.</td>
<td>HY 221, 222, or approval of instructor.</td>
</tr>
<tr>
<td>538</td>
<td>The United States in the Twentieth Century</td>
<td>3 hrs.</td>
<td>HY 221, 222, or approval of instructor.</td>
</tr>
<tr>
<td>574</td>
<td>The Renaissance and Reformation</td>
<td>3 hrs.</td>
<td>HY 391 or approval of instructor.</td>
</tr>
<tr>
<td>576</td>
<td>The Age of Reason, 1713-1789</td>
<td>3 hrs.</td>
<td>HY 391 or approval of instructor.</td>
</tr>
<tr>
<td>585</td>
<td>Twentieth Century Europe</td>
<td>3 hrs.</td>
<td>HY 392 or approval of instructor.</td>
</tr>
</tbody>
</table>
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, Rawson.

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.

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.

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.

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
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.

If a second foreign language is used as a cluster, a minimum of 12 semester hours above the basic course sequence in the language is required. The literature survey courses are required.

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.

333 Russian Masterpieces in English Translation 3 hrs.
Prerequisite: EH 206 or approval of Department Chairman.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Elementary French</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>(No credit without FH 102)</td>
<td></td>
</tr>
<tr>
<td>102</td>
<td>Elementary French</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: FH 101</td>
<td></td>
</tr>
<tr>
<td>201</td>
<td>Intermediate French</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: FH 102 or placement</td>
<td></td>
</tr>
<tr>
<td>202</td>
<td>Intermediate French</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: FH 201</td>
<td></td>
</tr>
<tr>
<td>303</td>
<td>French Conversation</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Oral drills, pronunciation exercises, simple oral reports. Prerequisite: FH 202.</td>
<td></td>
</tr>
<tr>
<td>304</td>
<td>Advanced French Composition</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Primarily a composition course with emphasis on idiomatic expression. Prerequisite: FH 202 or 303 or approval of Department Chairman.</td>
<td></td>
</tr>
<tr>
<td>305</td>
<td>Survey of French Literature</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>306</td>
<td>Survey of French Literature</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>A continuation of FH 305. French literature from 1800 to the present. Prerequisite: FH 202 or 305 or approval of Department Chairman.</td>
<td></td>
</tr>
<tr>
<td>307</td>
<td>French Civilization</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: FH 202</td>
<td></td>
</tr>
<tr>
<td>309</td>
<td>Explication de Texte</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>A study of methods of textual analyses, employing selected readings from French masterpieces. Prerequisite: FH 202 or approval of Department Chairman.</td>
<td></td>
</tr>
<tr>
<td>403</td>
<td>Epic and Chivalric Poetry</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>404</td>
<td>Classical Theater</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>A study of the masterpieces of French classic authors — Corneille, Racine, Moliere. Prerequisite: FH 305-306 or approval by Department Chairman.</td>
<td></td>
</tr>
<tr>
<td>405</td>
<td>The Century of Enlightenment</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
</tbody>
</table>
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, Maeterlinck, etc. Prerequisite: FH 305, 306 or approval of Department Chairman.

408 Twentieth Century 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 Great Names of Existentialism 3 hrs.
A study of the major works of Sartre, Camus, Simone de Beauvoir, G. Marcel, Boris Vian. Prerequisite: FH 305-306 or approval of Department Chairman.

410 Twentieth Century French Drama 3 hrs.
A study of prominent modern and contemporary French dramatists - Claudel, Anouilh, Montherlant, Giraudoux, Genet, 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.
No credit without GN 102.

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 or 213.

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

214 Intermediate Scientific German II. 3 hrs.
Prerequisite: GN 201 or 213.

310 Advanced German 3 hrs.
Rapid reading, conversation, literature. Prerequisite: GN 202 or 214 or approval of Department Chairman.

311 German Conversation 3 hrs.
Oral drills, pronunciation exercises, simple oral reports. Prerequisite: GN 202 or 214 or approval of Department Chairman.
312 Advanced German Composition and Usage 3 hrs.
Primarily a composition course with emphasis on idiomatic expression. Prerequisite: GN 202 or 214 or approval of Department Chairman.

313 Survey of German Literature 3 hrs.
A study of German literature from its beginning to 1785. Prerequisite: GN 202 or 214 or approval of Department Chairman.

314 Survey of German Literature 3 hrs.
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.

315 German Culture 3 hrs.
Lectures and discussions on German cultural history. Prerequisite: GN 202 or 214 or approval of Department Chairman.

316 Advanced Conversational German 3 hrs.
Prerequisite: GN 202 or 214 and 311 or approval of Department Chairman.

410 German Literature of the Middle Ages 3 hrs.
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 Auel). Prerequisite: GN 313-314 or approval of Department Chairman.

412 Goethe and Schiller 3 hrs.
Reading, discussion, and comparison of representative mature works of these two writers. Prerequisite: GN 313-314 or approval of Department Chairman.

413 German Romanticism 3 hrs.
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.

414 The German "Novelle" From Goethe to Kafka 3 hrs.
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.

415 Nineteenth Century German Drama 3 hrs.
An analysis of works from Kleist to Hauptmann, showing the development and range of nineteenth century German drama from romanticism to naturalism. Prerequisite: GN 313-314 or approval of Department Chairman.

416 Great Writers of the Early Twentieth Century 3 hrs.
A course focusing on selected works by Rainer M. Rike, Stefan George, Thomas Mann, Hermann Hesse, and Franz Kafka. Prerequisite: GN 313-314 or approval of Department Chairman.

417 Contemporary German Literature 3 hrs.
Current trends in Post-War German literature. Reading and discussion of
works by Grass, Boll, Lenz, Aichinger, Walser, Uwe Johnson, Schnurre, and others. Prerequisite: GN 313-314 or approval of Department Chairman.

418 Modern German Drama 3 hrs. 
A study of contemporary German drama from the turn of the century to the present (Hofmannsthal, Wedekind, Kaiser, Brecht, Borchert, Durrenmatt, and Frisch). 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: approval of Department Chairman.

421 The German Novel of the 19th Century 3 hrs. 
A detailed study of selected novels of the 19th Century (Moerike, Stifter, Keller, Gotthelf, Raabe, Fontane, etc.) with special emphasis on the “Buildings” or “Erziehungsroman”. Prerequisite: GN 313, 314 or approval of Department Chairman.

422 Modern German Novel 3 hrs. 
A study of important novels of our century, selected from the works of Mann, Hesse, Kafka, Doeblin, Broch, von Doderer, Musil, Grass, Boell, Frischch, etc. Prerequisite: GN 313, 314 or approval of Department Chairman.

423 Seminar on Major German Writers 3 hrs. 
Intensive study of one outstanding writer, i.e., Goethe, Schiller, Kleist, Keller, Mann, Hesse, Kafka or another. Prerequisite: 30 hrs. of German 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: GN 313, 314 or approval of Department Chairman.

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

Slavic Russian (RN)

101 Elementary Russian 3 hrs. 
No credit without RN 102.

102 Elementary Russian 3 hrs. 
Prerequisite: RN 101.

201 Intermediate Russian 3 hrs. 
Prerequisite: RN 201.

202 Intermediate Russian 3 hrs. 
Prerequisite: RN 201.
331 Russian Conversation and Composition 3 hrs.
Prerequisite: RN 202 or 234 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 234 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 234 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 234 or approval of Department Chairman.

339 Russian Poetry 3 hrs.
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.

431 History of the Russian Language 3 hrs.
Descriptive analysis and historical development of the phonology, morphology and syntax of present—day Russian. Prerequisite: RN 331, 332 or approval of Department Chairman.

433 Major Writers of the Nineteenth Century 3 hrs.
A study of representative works of Pushkin, Gogol and Dostoevsky. Prerequisite: RN 202 and approval of Department Chairman.

434 Major Writers of the Nineteenth Century 3 hrs.
A continuation of RN 433. A study of representative works of Tolstoy, Turgenev, and Chekhov. Prerequisite: RN 202 and approval of Department Chairman.

439 Gogol 3 hrs.
A thorough study of Gogol's major works especially Dead Souls. Style ideology and literary technique of the author shall be the main points considered. Prerequisite: approval of Department Chairman.

440 Dostoevsky 3 hrs.
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.

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

531 Old Church Slavonic 3 hrs.
A phonological and morphological study of Old Church Slavonic with special emphasis on grammar, reading and translating of old chronicles.

Spanish (SH)

101 Elementary Spanish 3 hrs.
No credit with SH 102.
102 Elementary Spanish  
Prerequisite: SH 101.

3 hrs.

201 Intermediate Spanish  
Prerequisite: SH 102 or placement.

3 hrs.

202 Intermediate Spanish  
Prerequisite: SH 201.

3 hrs.

323 Spanish Conversation and Phonetics  
Prerequisite: SH 202 or approval of Department Chairman.

3 hrs.

324 Advanced Spanish Grammar and Composition  
Recommended for teachers. Prerequisite: SH 202 or approval of Department Chairman.

3 hrs.

325 Survey of Spanish Literature  
A study of Spanish literature from its beginning to 1700. Prerequisite: SH 202 or approval of Department Chairman.

3 hrs.

326 Survey of Spanish Literature  
A continuation of 325. Spanish literature from 1700 to the present. Prerequisite: SH 202 or 325 or approval of Department Chairman.

3 hrs.

423 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.

3 hrs.

424 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.

3 hrs.

425 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.

3 hrs.

426 Nineteenth Century Spanish Novel  
Representative novelists and their works: Valera, Alarcon, Pereda, Galdos, Baroja. Prerequisite: SH 325-326 or approval of Department Chairman.

3 hrs.

427 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.

3 hrs.

429 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.

3 hrs.

499 Independent Studies  
Prerequisite: approval of Department Chairman.

1-3 hrs.
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 better prepares a musician and musician/teacher than a B.M. degree program. The degree will provide the foundation most students need for graduate study and many professional musical opportunities. In order to stay within 134 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 1974. Interested students should consult with the Department Chairman.

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. Transfer students majoring in music must demonstrate appropriate competencies to the faculty in the areas of performance, theory, and literature prior to enrollment. 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)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MU 1-4 - 4-3 Principal Instrument</td>
<td>16</td>
</tr>
<tr>
<td>(4 years; 8 hrs. upper level)</td>
<td></td>
</tr>
<tr>
<td>MU 1-0 - 2-0 Secondary Instrument</td>
<td>4</td>
</tr>
<tr>
<td>(2 years)</td>
<td></td>
</tr>
</tbody>
</table>
MU 101, 102, 103, 201, 202  
Theory/Harmony  
MU 110 Introduction to Music  
(literature)  
MU 311, 312 Music History  
MU 401 20th Century Material and Techniques  
MU 327 Conducting  
Music Elective  
Ensemble  

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory/Harmony</td>
<td>15</td>
</tr>
<tr>
<td>MU 110 Introduction to Music (literature)</td>
<td>3</td>
</tr>
<tr>
<td>MU 311, 312 Music History</td>
<td>6</td>
</tr>
<tr>
<td>MU 401 20th Century Material and Techniques</td>
<td>3</td>
</tr>
<tr>
<td>MU 327 Conducting</td>
<td>2</td>
</tr>
<tr>
<td>Music Elective</td>
<td>2</td>
</tr>
<tr>
<td>Ensemble</td>
<td>3-6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>54-57</strong></td>
</tr>
</tbody>
</table>

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

III. Electives (outside of AOC)  

Minimum Total Hours  

<table>
<thead>
<tr>
<th>Minimum Total Hours</th>
<th>134 hrs.</th>
</tr>
</thead>
</table>

**Electives (outside of AOC)**  

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 (12 terms), however, only from 3 to 6 hours of ensemble credit may be counted toward the degree, depending upon discipline chosen for the cluster.

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:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Studio Instruction 1-0 &amp; 2-0 (6 terms)</td>
<td>4 hours</td>
</tr>
<tr>
<td>Music Theory 101, 102, 103</td>
<td>9 hours</td>
</tr>
<tr>
<td>Introduction to Music 110</td>
<td>3 hours</td>
</tr>
<tr>
<td>Music History 312</td>
<td>3 hours</td>
</tr>
<tr>
<td>Ensemble</td>
<td>6 hours</td>
</tr>
<tr>
<td></td>
<td>25 hours</td>
</tr>
</tbody>
</table>

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 and chordal 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.
Designed to promote the understanding and appreciation of music through better listening practices.

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.

201 Advanced Theory of Music IV 3 hrs.
Continuation of studies in MU 101-103 on a more advanced basis. Prerequisite: MU 103.

202 Advanced Theory of Music V 3 hrs.
A continuation of MU 201. Prerequisite: MU 201.

215 Teaching Music in the Elementary School 3 hrs.
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.

304 Analysis of Music Form 3 hrs.
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.

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

320 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.

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

401 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 & 312.

411 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 experiences. May be repeated, but no more than two hours will count toward degree requirements.

427 Advanced Conducting
Further development of baton techniques and score reading of instrumental and choral-instrumental compositions. 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 to the instructor, prior to registration, their level of proficiency.

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, 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.

130 Studio Instruction in Piano
For secondary instrument or non-music credit. May be repeated. Prerequisite: approval of instructor.

230 Studio Instruction in Piano
For secondary instrument credit. Prerequisite: MU 130 and approval of instructor.
<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Hours</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>132, 133, 231, 232, 233, 331, 332, 333, 431, 432, 433</td>
<td>Studio Instruction in Piano</td>
<td>1-1/3 hrs.</td>
<td>For principal instrument music credit. Prerequisite: approval of instructor.</td>
</tr>
<tr>
<td>140</td>
<td>Studio Instruction in Voice</td>
<td>2/3 hrs.</td>
<td>For secondary instrument or non-music credit. May be repeated. Prerequisite: approval of instructor.</td>
</tr>
<tr>
<td>240</td>
<td>Studio Instruction in Voice</td>
<td>2/3 hrs.</td>
<td>For secondary instrument credit. Prerequisite: MU 140 and approval of instructor.</td>
</tr>
<tr>
<td>250</td>
<td>Studio Instruction in Voice</td>
<td>2/3 hrs.</td>
<td>For secondary instrument credit. Prerequisite: MU 150 and approval of instructor.</td>
</tr>
<tr>
<td>260</td>
<td>Studio Instruction in Voice</td>
<td>2/3 hrs.</td>
<td>For secondary instrument credit. Prerequisite: MU 160 and approval of instructor.</td>
</tr>
</tbody>
</table>

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.

190 UAH Choir
Mixed voices singing the serious choral repertoire. 1 hr.

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

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

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

195 Music for Awhile Ensemble
Solo/ensemble performance, specializing in early and contemporary music. Normally offered winter term only. 1 hr.

196 Chamber Ensembles
Discussion, evaluation and performance of literature available for selected, small musical ensembles. Ensembles such as piano trios, (piano, violin, cello) quartets, quintets, string quartets, woodwind, brass and percussion, and vocal ensembles. 1 hr.

198 Huntsville Symphony Orchestra
The Civic Symphony of some seventy-five players with international guest artists, major works by symphonic, operatic, and choral literature are performed. Open to qualified student by audition and consent of the conductor. 1 hr.

199 UAH Wind Ensemble
Open to all students of the University by audition. Preparing the finest music literature for wind ensemble and band. Attendance at all rehearsals and performances required. 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.

204 History of Western Philosophy 3 hrs.
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.

205 History of Western Philosophy 3 hrs.
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.

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

252 Ethics 3 hrs.
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.
310 Contemporary European Philosophy 3 hrs.
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 3 hrs.
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.

332 Epistemology 3 hrs.
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 3 hrs.
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 philosophy including PHL 101 or approval of instructor.

362 Introduction to Political Philosophy 3 hrs.
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 3 hrs.
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 Professor: Brinkman; Instructors: Rainey, Schiltz, White (chairman)

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
A survey of the principles, institutions, and practices of American national government.

102 Problems 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.

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 3 hrs.
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 3 hrs.
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 3 hrs.
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 3 hrs.
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 3 hrs.
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 3 hrs.
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 3 hrs.
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 Electoral 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, conse­
quences 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, fascism, Marxism and its
variants.

364 American Political Theory 3 hrs.
An examination of the main currents in American political thought from
its European antecedents 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 3 hrs.
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 3 hrs.
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.

406 The Commonwealth of Nations 3 hrs.
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 3 hrs.
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 201 or permission of the instructor.

427 Government and Crisis in Sub-Saharan Africa 3 hrs.
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.

439 Recent and Contemporary American Foreign Policy 3 hrs.
An intensive study of selected problems in American foreign policy since 1939 in the light of ideological conflicts, domestic factors, and the national interest. Same as HY 439.

472 The American Judicial Process 3 hrs.
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 3 hrs.
An intensive examination of the theoretical approaches to the study of international politics with a focus on systems theory, defense planning, and game theory. Prerequisite: PSC 315.

495 Advanced Comparative Politics 3 hrs.
An intensive study of comparative aspects of democratic political cultures, and a study of theoretical approaches to the study of comparative politics. Prerequisite: PSC 205.

496 Comparative Politics of Race 3 hrs.
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  3 hrs.
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  3 hrs.
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  3 hrs.
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.
Purposes, 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.

591  The Transportation Crisis  3 hrs.
The course considers a brief history of the role of transportation in society; the goals of a transport system; modal coordination of divergent systems; the social implications of such phenomena as mass transit, airports and automobiles; and the international ramifications of governmental policies relative to transport expansion and trade.

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 100, 103, 204, 231, 426 and any two of the three experimental psychology courses.

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 100, 103, 204 and 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 100, 103, 204 and two of the three 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 number 3 above.

The 6 hour General Education Social Science Requirement may be satisfied by taking both PY 100 and PY 103. PY 100 and PY 103 are both required for all students taking more than 15 hours in psychology. Either PY 100 or PY 103 may be taken first, but they may not be taken at the same time.
Psychology (PY)

100 Introduction to Psychology 3 hrs.
An introduction to fundamental principles governing the relationship between behavior and the environment, with a primary focus on the principles of reinforcement, extinction, discrimination and chaining. (See note above.)

103 General Psychology 3 hrs.
A survey of the empirical findings of the major areas of psychology, with primary focus on general methodology, development, personality, abnormal and social psychology. (See note above.)

204 Laboratory Procedures 3 hrs.
An introduction to behavioral research techniques and descriptive statistics. Includes laboratory. Prerequisite: PY 100, 103. PY 231 is strongly recommended before PY 204.

207 Principles of Personal Reconciliation 3 hrs.
An examination of the application of basic principles in psychology to the origin and resolution of personal conflicts. Prerequisite: PY 100, 103.

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 SOC 231.

300 Experimental Psychology A: Learning 4 hrs.
The study of the role of reinforcement in the acquisition and modification of behavior. Both empirical and theoretical material is considered. Includes laboratory. Prerequisite: PY 100 and 103.

302 Experimental Psychology B: Motivation 4 hrs.
The study of the origin and value of the concept of motivation. Includes laboratory. Prerequisite: PY 100 and 103.

304 Experimental Psychology C: Perception 4 hrs.
A functional analysis of the processing and interpretation of sensory information. Includes laboratory. Prerequisite: PY 100, 103.

311 Individual Differences 3 hrs.
A study of the factors, both learned and innate, that lead to individually unique patterns of behavior. Prerequisite: PY 100, 103.

313 Psychometrics 3 hrs.
Theory and practice within psychological testing. Prerequisite: PY 100, 103, 231.

315 Developmental Psychology 3 hrs.
The developmental process from infancy through adolescence. Special attention is given to the role of the environment in the developmental process. Prerequisite: PY 100, 103.

390 Readings in Psychology 3 hrs.
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.

401 Personality 3 hrs.
Various theories of personality are examined, along with possible implications for research. Prerequisite: 15 hours PY.

403 Abnormal Psychology 3 hrs.
An examination of major behavioral exceptionalities, with an emphasis on empirical findings. Prerequisite: PY 401 or approval of instructor.

406 Physiological Psychology 3 hrs.
A functional analysis of the neural and endocrinological systems underlying behavior. Prerequisite: 15 hours PY.

408 Human Learning 3 hrs.
Study of contemporary issues and theoretical contingencies regarding factors influencing human learning and forgetting. Prerequisite: 15 hours PY.

409 Behavior Modification 3 hrs.
The application of principles of human learning to the treatment of behavioral problems, neuroses and psychoses. Prerequisite: PY 403.

420 Seminar in Psychology 3 hrs.
Student reports on psychological problems within a particular area are presented and discussed. Prerequisite: 15 hours PY and approval of instructor. May be taken twice for credit.

422 Individual Research 3 hrs.
The student, with the advice of an instructor, will design and execute an original experiment in psychology. Prerequisite: 15 hours PY and approval of instructor. May be taken twice for credit.

426 History and Systems in Psychology 3 hrs.
A study of the history of psychology as it has led to the development of systematic study within the field. Prerequisite: 12 hours PY.

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: 15 hours PY.

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.

508 Individual Mental Testing: Wechsler 3 hrs.
Individual testing with the Wechsler tests, along with practical experience. Includes laboratory. Prerequisite: PY 506.

Sociology

Associate Professor: Tarter (acting chairman); Assistant Professors:
Kilgo, Smith; Instructors: Herb, Donaghy; Adjunct Professor: McCalister.

**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; institu­
tional 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 3 hrs.
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 3 hrs.
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 3 hrs.
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 3 hrs.
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 3 hrs.
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 3 hrs.
Surveys the relationship of sociology and social psychology to the field of medicine. It covers the role and status of medical and para-medical personnel in the United States, as well as analysis of health care delivery systems and problems encountered therein.

455 Industrial Sociology 3 hrs.
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 3 hrs.
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.

475 Mass Communications and Public Opinion 3 hrs.
An examination of the mass media as a social force in modern society. Emphasis is placed on the role of the mass media in forming public opinion and policy. Offered on demand. Prerequisite: SOC 100 or approval of instructor.

480 Social Change and the Future 3 hrs.
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 3 hrs.
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.
School of Science and Engineering

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 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: computer engineering, electrical engineering, environmental 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.
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.

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; 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 BY 221, 319, one course from comparative anatomy and morphology (either botanical or zoological), and one course in physiology. 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 and medical technology programs, the AOC will include courses as follows: BY 221, 317 or 354; 319, 431 or 432, two biology seminars (596, 597, 598, 599) and at least 10-12 additional hours of biology in support of the specific program. (See sample curricula VI and VII.)

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.

Curriculum I

B.A. Degree Appropriate for a Biology Major with an Associated Cluster in Social Sciences.

<table>
<thead>
<tr>
<th>Semester Hours</th>
<th></th>
</tr>
</thead>
<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 101, 105, 131</td>
<td>8</td>
</tr>
<tr>
<td>Physics-PH 101, 102</td>
<td>8</td>
</tr>
<tr>
<td>Mathematics-MA 133, 153</td>
<td>6</td>
</tr>
<tr>
<td>Humanities, social sciences, economics or associated cluster</td>
<td>21</td>
</tr>
<tr>
<td>Electives (education core if a Class B Secondary Professional Teaching Certificate is desired)</td>
<td>27–30</td>
</tr>
</tbody>
</table>
Curriculum II

B.S. Degree for Secondary Teachers of Biology and Chemistry

Semester Hours

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, 333, 335, 336 20
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

Semester Hours

General Educational Requirements (humanities and social sciences) 30–36
Biology core courses and biology electives 30–32
Chemistry-CH 121, 123, 125, 126, 223, 331, 332, 333, 335, 336, 341 (341 desirable) 20
Mathematics-MA 153, 154, 223 9
Physics-PH 101, 102 8
Electives 27–35

Curriculum IV

B.S. Degree with Chemistry Cluster, Preparatory for Graduate Study

Semester Hours

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, 333, 335, 336, 341, 342  25
Mathematics-MA 153, 154, 233, 244, 385  15
Physics-PH 101, 102, 201  11
Electives  12–20

Curriculum V

B.S. Degree with Physics-Chemistry Cluster, Preparatory for Graduate Study

Semester Hours

General Education Requirements (humanities and social sciences)  30–36
Biology core courses and biology electives  30–32
Chemistry-CH 121, 123, 125, 126, 331, 332, 333, 335, 336  16
Mathematics-MA 153, 154, 233, 244, 385  15
Physics-PH 101, 102, 201, 202, 203, 301  20
Electives  12–20

Curriculum VI

B.S. Degree, Premedical, Predental, Preveterinary (See chemistry section for an alternate premedical curriculum.)

Semester Hours

General Education Requirements (humanities and social sciences)  30–36
Biology core courses and biology electives
(To include either BY 317 or 354 and 542.)  30–32
Chemistry-CH 121, 123, 125, 126, 223, 331, 332, 333, 335, 336, 341, (341 desirable)  20
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>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Requirements (humanities and social sciences)</td>
</tr>
<tr>
<td>Basic biology courses</td>
</tr>
<tr>
<td>Biology-BY 521, 569, 579</td>
</tr>
<tr>
<td>Chemistry-CH 121, 123, 125, 126, 223, 331, 332, 333, 335, 336</td>
</tr>
<tr>
<td>Mathematics-MA 133, 153, 154</td>
</tr>
<tr>
<td>Physics-PH 101, 102</td>
</tr>
<tr>
<td>Internship in an accredited school (or electives)</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, 333, 335, 336 20
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

<table>
<thead>
<tr>
<th>Semester</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>Hours</td>
<td></td>
</tr>
<tr>
<td>30-36</td>
<td></td>
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<tr>
<td>11</td>
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<td>335, 336</td>
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<tr>
<td>6</td>
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<tr>
<td>16</td>
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</tr>
</tbody>
</table>

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, 333, 335, 336 20
Physics-PH 101, 102 8
Mathematics-MA 153, 154, 233 9
Environmental Sciences-ES 102 4
Computer Sciences-CS 113, 208 6
Electives 16

Biology (BY)

113 General Biology 4 hrs.
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 4 hrs.
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 or approval of instructor.

213 Human Ecology I 4 hrs.
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 4 hrs.
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, or approval of instructor.

221 General Microbiology 5 hrs.
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 102 recommended. Should be taken no later than sophomore year.

238 Local Flora 2 hrs.
Primarily a laboratory course to acquaint the student with basic taxonomical procedures and taxonomical determination of local angiosperms, primarily dicots. Prerequisite: BY 113 or approval of instructor.

278 Invertebrate Zoology 5 hrs.
A phylogenetic consideration of the invertebrate phyla including morphology and ecology. Two 3-hour labs per week. Prerequisites: BY 114 or approval of instructor. Offered Fall Term.

312 Principles of Ecology 4 hrs.
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 5 hrs.
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 or approval of instructor.

319 Genetics 2 hrs.
An introduction to the principles of inheritance and application of these principles to plants and animals to the human being. Not open to freshmen. Prerequisite: BY 114 or approval of instructor.

320 Genetics Lab 2 hrs.
Prerequisite or parallel: BY 319

354 Vertebrate Embryology 5 hrs.
The embryology of the vertebrates including gametogenesis, fertilization of the egg, stages of cleavage, and development of organs and organ systems.
Two 3-hour labs per week. Prerequisite: BY 114 or approval of instructor.

368 Cell Biology I 4 hrs.
A study of ultrastructure and morphology of cells and their organelles as they relate to cellular function. Laboratory will include an introduction to methods used in the study of cells. One 3-hour lab per week. Prerequisite: BY 319, chemistry through organic, or approval of instructor.

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 or approval of instructor.

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 or approval of instructor.

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, or approval of instructor.

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, or approval of instructor.

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 or approval of instructor.

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.

The courses 500-505 below in marine biology will be taught at the Marine Environmental Consortium located at Dauphin Island, Alabama.

500 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. Student will have an opportunity to examine marshland, estuarine, beach, dune, inlet and neritic habitats and niches. Lecture, laboratory, and field work will be included. Prerequisite: general biology and consent of instructor.
501 Marine Ecology
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; marine invertebrate zoology or marine biology is recommended. This course recommended for engineers and other non-biologists interested in the marine environment. Individual species will be studied as they relate to ecological principles which they exemplify, providing both a taxonomic and ecologic background. Prerequisite: general biology, general chemistry, general physics, and consent of instructor.

502 Marine Vertebrate Zoology
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. Prerequisite: general biology and consent of instructor.

503 Marine Invertebrate Zoology
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. Prerequisite: general biology and consent of instructor.

504 Fisheries Science
An in-depth study of the principles and methods of fishery biology and their application to conservation. Lecture and laboratory work are included. Prerequisite: general biology and consent of instructor.

505 Coastal Ornithology
Study of coastal and pelagic birds with emphasis on ecology, taxonomy, and distribution. This course includes identification, population dynamics, and behavior of coastal birds and overnight trips to offshore islands. Prerequisite: general biology and consent of instructor.

513 Plant Ecology
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
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.

521 Pathogenic Microbiology
A study of bacteria in relation to infectious diseases. Two 3-hour labs per week. Prerequisite: BY 221 or approval of instructor.

522 Environmental Microbiology
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 or approval of instructor.
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 or approval of instructor.

542 Cellular Physiology 4 hrs.
A study of the underlying principles governing some basic cellular phenomena. One 3-hour lab per week. Prerequisite: organic chemistry.

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.

568 Cell Biology II 4 hrs.
An integrated approach to the fine structure and function of various cellular processes. Special attention will be given to particular aspects of cellular processes each term, e.g., motility in cells, cellular differentiation, etc. Laboratory included. Prerequisite: BY 368 or 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.

Chemistry

Professors: Arendale (chairman), McManus; Associate Professors: Dodson, Emerson, Harris, Riley; 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:

Semester Hours

General Education Requirements (humanities and social sciences) 30–36
General Education Requirements (science and Mathematics) 26–28
Chemistry (Requirement 2 above) 18

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.)
### 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>Semester</th>
<th>Hours</th>
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<tbody>
<tr>
<td></td>
<td>3</td>
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<tr>
<td></td>
<td>12</td>
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<tr>
<td></td>
<td>12</td>
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<tr>
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<td>19–21</td>
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</table>

<table>
<thead>
<tr>
<th>Semester</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 core</td>
<td>27</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>
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</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>Semester</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>
</tbody>
</table>
Mathematics—MA 244, 251, 352  
Mathematics or physics elective  
Electives

Curriculum IV

General Education Curriculum with a Chemistry Major

Deficiencies may exist with respect to graduate school entrance requirements.

<table>
<thead>
<tr>
<th>Semester</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>
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</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) PH 241, 331, 351, one laboratory from 310–312, and one elective, or</td>
<td>13</td>
</tr>
<tr>
<td>(b) PH 351, 401, one laboratory from 310–312, and one elective</td>
<td>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

Electives

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 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 the student selects his thesis topic, a supervisory committee will be appointed.
Specific requirements:
1. 24 semester hours of graduate course work and a thesis.
2. Reading competence in German or Russian. The faculty may accept other languages under special circumstances.

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 11. Parallel: CH 105.

105 General Chemistry Laboratory 1hr.
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

121 Introduction to Chemistry. 3 hrs.
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.

122 Introduction to Chemistry. 2 hrs.
A continuation of CH 121. Prerequisite: CH 121

123 Introduction to Chemistry 3 hrs.
A continuation of CH 121 with in-depth study of the topics listed. Prerequisite: CH 121. Parallel: CH 126.

125 Introductory Chemistry Laboratory 1 hr.
Laboratory work which complements the lecture material for CH 121. Parallel: CH 121.

126 Qualitative Inorganic Analysis Laboratory. 1 hr.
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 complexion compounds.

131 Introduction to Organic Chemistry. 4 hrs.
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.
223 Quantitative Analysis. 4 hrs.
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.

261 Nutritional Biochemistry. 4 hrs.
A treatment of the major classes of nutrients with emphasis on the metabolic processes involving carbohydrates, lipids, and proteins. Includes laboratory. Not open to students seeking the B.S. degree in biology or chemistry. Prerequisite: BY 114, CH 131.

331 Elementary Organic Chemistry. 2 hrs.
The chemistry of organic compounds is systematically studied. Discussion includes synthetic methods, theory and reaction mechanisms. Prerequisite: CH 123, 126; CH 223 recommended.

332 Elementary Organic Chemistry. 2 hrs.
Continuation of CH 331. Prerequisite: CH 331.

333 Elementary Organic Chemistry. 2 hrs.
Continuation of CH 332. Prerequisite: CH 332.

335 Elementary Organic Chemistry Laboratory I. 1 hr.
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. 1 hr.
Continuation of CH 335. Prerequisite: CH 335. Prerequisite or Parallel: CH 332.

337 Organic Chemistry Laboratory. 2 hrs.
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. 3 hrs.
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. 2 hrs.
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. 2 hrs.
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. 1 hr.
Laboratory investigations into the general area of thermodynamics. Prerequisite: CH 341.
346 Experimental Physical Chemistry II. 1 hr.
Laboratory investigations into the general area of kinetics and spectroscopy. Prerequisite: CH 345. Parallel: 343.

401 Inorganic Chemistry. 3 hrs.
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.

461 Introduction to Biochemistry. 3 hrs.
An introduction to contemporary molecular biochemistry. Emphasis is on mechanisms of biochemical reactions. Prerequisite: CH 333, BY 114.

462 Introductory Biochemistry Laboratory 1 hr.
Laboratory investigations into the general area of biochemistry. Prerequisite or parallel: CH 461.

491, 492, 493. Introduction to Chemical Research. 1-3 hrs.
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. 3 hrs.
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.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>540</td>
<td>High Polymer Chemistry</td>
<td>3</td>
<td>The theory of polymer formation and the structural dependence of polymer properties are discussed. Prerequisite: CH 337, 342.</td>
</tr>
<tr>
<td>549</td>
<td>Spectroscopy and Molecular Structure</td>
<td>3</td>
<td>An intermediate level treatment of the principles of spectroscopy and their application to the determination of molecular structure. Prerequisite: CH 343.</td>
</tr>
<tr>
<td>553</td>
<td>Introductory Quantum Mechanics I</td>
<td>3</td>
<td>Same as PH 551. Prerequisite: CH 343, PH 351; MA 224, 251, 352.</td>
</tr>
<tr>
<td>554</td>
<td>Introductory Quantum Mechanics II</td>
<td>3</td>
<td>Same as PH 552. Prerequisite: CH 553.</td>
</tr>
<tr>
<td>600</td>
<td>Advanced Inorganic Chemistry</td>
<td>3</td>
<td>A survey course with emphasis on the structure and reactivity of inorganic compounds. Prerequisite: CH 401.</td>
</tr>
<tr>
<td>601</td>
<td>Structural Methods in Inorganic Chemistry</td>
<td>3</td>
<td>The study of various physical methods applied to the determination of the structure of inorganic compounds. Prerequisite: CH 600.</td>
</tr>
<tr>
<td>602</td>
<td>Chemistry of Coordination Compounds</td>
<td>3</td>
<td>Modern bonding theory and stereochemistry of coordination compounds will be presented. Prerequisite: CH 601.</td>
</tr>
<tr>
<td>603</td>
<td>Chemistry of Non-Metal Compounds</td>
<td>3</td>
<td>A study of the chemistry of selected non-metal compounds. Prerequisite: CH 601.</td>
</tr>
<tr>
<td>621</td>
<td>Methods of Chemical Analysis</td>
<td>3</td>
<td>A literature, seminar course which emphasizes the theory and methodology of various techniques of chemical analysis. Prerequisite: CH 521.</td>
</tr>
<tr>
<td>631</td>
<td>Advanced Organic Chemistry I</td>
<td>3</td>
<td>A systematic study of the reaction mechanisms of various types of organic compounds. Prerequisite: CH 531.</td>
</tr>
<tr>
<td>632</td>
<td>Advanced Organic Chemistry II</td>
<td>3</td>
<td>A course which is complementary to previous courses and treats special classes of compounds and natural products.</td>
</tr>
<tr>
<td>633</td>
<td>Synthetic Organic Chemistry</td>
<td>3</td>
<td>A study of the reactions and principles involved in the synthesis of simple and complex organic compounds. Prerequisite: CH 632.</td>
</tr>
<tr>
<td>640</td>
<td>Advanced Chemical Thermodynamics</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>641</td>
<td>Statistical Thermodynamics</td>
<td>3</td>
<td>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.</td>
</tr>
</tbody>
</table>
642 Advanced Chemical Dynamics. 3 hrs.
Concepts related to the velocity of chemical reactions in homogeneous and heterogeneous 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.

780 Chemistry Seminar. 1 hr.
A minimum of two terms required of all students working toward the M.S. degree.

799 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.

899 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 331, 411, 514, 512 or 513
(b) CS 309, 415, 512 or 513

Graduate—CS 511 and one of the following options:

(a) CS 512 or 513 or 690 or 691 or 514
(b) CS 512, 513, 690, 691 or 514
Computer Science (CS)

113 Introduction to Computing  
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. Prerequisite: MA 105 or Level II placement in mathematics.

208 Computer Organization and Software Systems I  
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. Same as EG 208.

214 Introduction to Discrete Structures  
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  
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. Same as EG 308.

309 Switching Theory  
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 on CS 308. Same as EG 309.

311 Computer Applications in Economics and Business I  
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  
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 308 or CS 511. 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 and consent of instructor. Same as EC 514.

690 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.

691 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 511 or 513. Same as EG 691.

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>Course Description</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology 113, 114</td>
<td>8</td>
</tr>
<tr>
<td>Chemistry 121, 122, 125, 126</td>
<td>7</td>
</tr>
<tr>
<td>Physics 101, 102</td>
<td>8</td>
</tr>
<tr>
<td>Environmental Science 101, 102</td>
<td>8</td>
</tr>
<tr>
<td>Two basic courses in Statistics (ST) and/or Computer Science (CS)</td>
<td>6</td>
</tr>
</tbody>
</table>

II. Environmental Core (all required)

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BY 312 - Principles of Ecology</td>
<td>4</td>
</tr>
<tr>
<td>ES 303 - Environmental Climatology</td>
<td>3</td>
</tr>
<tr>
<td>ES 311 - Environmental Geology and Hydrology</td>
<td>3</td>
</tr>
<tr>
<td>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.)

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BY 522 - Environmental Microbiology</td>
<td>5</td>
</tr>
<tr>
<td>BY 585 - Limnology</td>
<td>5</td>
</tr>
<tr>
<td>BY 501 - Marine Ecology</td>
<td>4</td>
</tr>
<tr>
<td>CH 525 - Environmental Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>EG 542 - Environmental Engineering</td>
<td>3</td>
</tr>
<tr>
<td>EG 524 - Human Factors</td>
<td>3</td>
</tr>
<tr>
<td>EG 427 - Management Science</td>
<td>3</td>
</tr>
<tr>
<td>EG 422 - Systems Analysis</td>
<td>2</td>
</tr>
<tr>
<td>EG 543 - Noise Pollution</td>
<td>3</td>
</tr>
<tr>
<td>ES 304 - Environmental Meteorology</td>
<td>3</td>
</tr>
<tr>
<td>ES 521 - Environmental Data Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

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: ES 101 and 102, 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. Same as EG 394.

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: ES 102 and 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.

521 Environmental Data Analysis
3 hrs.
Overview of computer hardware, software, communications, and terminals; Univac control language; management information systems; overview of techniques of modeling and simulation as applied to air, water, and noise pollution. Prerequisites: computer programming, systems analysis, and statistics.

Mathematics and Statistics

Professor: Horner; Associate Professors: Cook, (Chairman), Doss, Forte, Gibson, Hoomani, Roach; Assistant Professors: Casazza, Gatzke; Instructors: Coward, Holt, Turner, Wolfe

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 453 (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 should include MA 442 or 443.

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 appropriate 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.

Students who are majoring in an area which does not require any calculus courses (e.g., students in humanities or in some areas of
sciences) and who begin their MA courses with MA 104 or 143 or 243 and later choose to continue in mathematics may select a cluster in mathematics without loss of credit. One typical such cluster consists of MA 143, 243, 244, 333, 350, 385, and 442.

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 Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Requirements:</td>
</tr>
<tr>
<td>English and History</td>
</tr>
<tr>
<td>Language (French, German or Russian recommended)</td>
</tr>
<tr>
<td>Social Sciences</td>
</tr>
<tr>
<td>Mathematics (courses numbered below 150)</td>
</tr>
<tr>
<td>Laboratory Science</td>
</tr>
</tbody>
</table>

(For B.A.: 8 hrs. in one science or a science cluster with no additional science. For B.S.: 8 hrs. in one science with the cluster in another, or 8 hrs. in each of two sciences.)

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 |

Curriculum II

B.A. or B.S. Degree with Major in Mathematics; Meets Requirements for a Class B Secondary Professional Teaching Certificate.
General Education Requirements:
English, History, Speech and Psychology  
Language (French, German, or Russian recommended)  
Social Sciences (Economics, Political Science, or Sociology)  
Mathematics (courses numbered below 150)  
Science  

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 hrs. in Biology with a Physical Science cluster  
(b) 8 hrs. in a Physical Science with a Biology cluster  
(c) 8 hrs. in a Physical Science and 8 hrs. in Biology

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)

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.
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, 221, 319, 320, one BY elective numbered above 300, CH 121 and 125.

(b) Chemistry—CH 121, 123, 125, 126, 331, 332, 333, 335, 336, 341.

(c) Physics—PH 101-102, 201, 241, 321, 331, 351.

(d) Psychology—PY 101 or 103, 204, 401; two of PY 300, 302, 304, ST 287; and PY 313 or MA 385 or MA 585.

(e) Economics—EC 142, 143, 340, 341, 345, 448, and ST 287.
(f) Operations Research—EG 196, 220, 390, 421, and any four of EG 511, 523, 524, 525, MA 585.

(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. (See School of Graduate Studies and Research Section.)

In addition to fulfilling the Graduate School requirements, each student’s program (except in the probability-statistics option 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.

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 at UAH.

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
3 hrs.
No credit given to students who have received credit for another MA course or who are placed at Level II or above. Introduction to mathematical reasoning: sets, set operations, and relations; the system of whole numbers; numeration systems; fundamental algorithms; systems of integers and rational numbers; real numbers; elementary number theory. Prerequisite: one unit of high school algebra and Level I placement.

105 College Algebra
3 hrs.
No credit given to students who have received credit for another MA course or who are placed at Level II or above. Sets, set operations, functions, relations, graphs, the real number system, solution of equations, inequalities, systems of linear equations and inequalities, matrices, determinants, mathematical induction, exponents, exponential functions, logarithms, and logarithmic functions. Prerequisite: one unit of high school algebra and Level I placement.

133 Algebra and Trigonometry
3 hrs.
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
3 hrs.
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
3 hrs.
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
3 hrs.
The differential and antidifferentiation, the definite integral, applications of the definite integral, logarithmic and exponential functions, trigonometric and hyperbolic functions. Prerequisite: MA 153.
233 Calculus and Analytic Geometry 3 hrs.
Techniques of integration, polar coordinates, the conic sections, indeterminate forms, improper integrals, Taylor’s formula, vectors in the plane, parametric equations, and vectors in three-dimensional space. Prerequisite: MA 154.

243 Mathematical Structures 3 hrs.
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.

244 Introduction to Linear Algebra 3 hrs.
No credit given to students who have successfully completed either MA 442 or MA 453. 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.

251 Calculus and Analytic Geometry 3 hrs.
Sequences, infinite series, power series, solid analytic geometry, differential calculus of functions of several variables (including limits, continuity, partial derivatives, and directional derivatives), and multiple integrals. Prerequisite: MA 233.

333 Introduction to Geometry 3 hrs.
Axiomatic development of geometry. Introduction to non-euclidean geometries with emphasis in elliptic and hyperbolic geometries. Selected topics in euclidean geometry. Prerequisite: MA 243 or 244 or approval of instructor.

350 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 453. Prerequisite: MA 243 or MA 244.

352 Introduction to Differential Equations 3 hrs.
First-order equations, linear equations, series solutions, systems of equations, existence theory, and selected topics. Prerequisite: MA 244 or EG 281, MA 251.

385 Introduction to Probability 3 hrs.
No credit given to students who have successfully completed MA 685. Probability spaces, discrete random variables, conditional probability, expectation; Bernoulli, Poisson and other random processes, basic distributions. Prerequisite: MA 244, or 261, or MA 243 and approval of instructor.

415 Elementary Numerical Methods 3 hrs.
Iteration techniques, convergence, error effects, analysis of special methods such as those of Newton, Befistol, and Graeffe, difference equations, approximation and interpolation. Use of digital computer recommended. Prerequisite: MA 244, 251, or approval of instructor.
442 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.

453 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 and properties of limits, continuous functions and their properties, uniformly continuous functions and their properties, derivatives and their properties, and Taylor's theorem. Prerequisite: MA 350 or 352 or 442.

490 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.

515 Numerical Analysis 3 hrs.
Predictor-corrector, Runge-Kutta, and “shooting” methods; error bounds and convergence; selected topics. Prerequisite: MA 352, 453 or approval of instructor. Fortran recommended.

521 Introduction to Complex Analysis 3 hrs.
Complex algebra, analytic functions, Cauchy-Riemann equations, exponential, trigonometric, and logarithmic functions, integration, Cauchy integral theorem, Morera's theorem, Liouville's theorem, maximum modulus theorem, residue theory, Taylor and Laurent series, and applications. Prerequisite: MA 453 or approval of instructor.

525 Intermediate Differential Equations 3 hrs.
Systems of linear ordinary differential equations with constant coefficients, plane autonomous systems, stability, and selected topics related to properties and characterization of solutions. Prerequisite: MA 352.

526 Partial Differential Equations 3 hrs.
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 3 hrs.
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 3 hrs.
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 3 hrs.
Vector spaces, linear transformations, matrices, determinants, eigenvalues, similarity, linear functionals, bilinear forms, quadratic forms, orthogonal and unitary transformations. Prerequisite: MA 442 or 453.
551 Functions of Several Variables 3 hrs.
Topology of En, limits and continuity of functions of several real variables, differentiation, applications of partial differentiation, Jacobians, the implicit function theorem and extremum problems. Prerequisite: MA 453.

554 Introduction to Real Analysis II 3 hrs.
Infinite series and convergence, sequences and series of functions, power series and their properties, functions of bounded variation, the Riemann-Stieltjes integral and its properties. Prerequisite: MA 453.

570 Metric and Normed Spaces 3 hrs.
Metric spaces, normed spaces, subspaces, bounded sets, continuous functions and their extensions, completeness, total boundedness, category, separability, compactness, product spaces, fixed point theorems, and applications. Prerequisite: MA 453.

585 Probability 3 hrs.
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 3 hrs.
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 3 hrs.
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 3 hrs.
Types of problems in the calculus of variations, a study of necessary conditions and sufficient conditions for the extremum of a definite integral in both parametric and nonparametric representation in the plane, the Bolza problems, extension to higher dimensions. Prerequisite: MA 453 or prior experience with calculus of variations.

642 Abstract Algebra 3 hrs.
Elementary set theory, equivalence relations, elementary group theory, subgroups, normal subgroups, factor groups, homomorphisms, inner and outer automorphisms, permutation groups, rings, integral domains, fields and skew fields, Euclidean rings, polynomials, vector spaces, modules, extension fields, roots, and elements of Galois theory. Prerequisite: MA 442, 453, or 544.

644 Matrix Theory I 3 hrs.
Matrix polynomials, characteristic and minimal polynomials, function 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 3 hrs.
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 Stone-Weierstrass 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 3 hrs.
The complex number system and topology of the complex plane, analytic functions, elementary functions with an introduction to Riemann surfaces, integration in the complex plane, Cauchy’s integral theorem, Cauchy’s integral formula and its consequences, functions defined by infinite series, Taylor’s series, the identity theorem, the maximum and minimum principles, isolated singularities, Laurent series, and the residue theorem. Prerequisite: MA 453, 554 or approval of instructor.

670 Introduction to Functional Analysis 3 hrs.
Normed and inner product spaces, finite dimensional spaces, product and quotient spaces, equivalent norms, 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 3 hrs.
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 3 hrs.
Normal, stationary and Poisson process, counting and renewal processes, discrete and continuous Markov chains, and generalized recurrent events. Prerequisite: MA 585, 544 or approval of instructor.

690 Special Topics in Mathematics 3 hrs.
The purpose of this course is to enable the mathematics faculty to comply with requests for courses in special topics. Prerequisite: approval of instructor.

743 Group Theory 3 hrs.
Isomorphism theorems, permutation groups, finite abelian groups; the basis theorem, the Remak-Kruehl-Schmidt theorem, the Sylow theorems, the Jordan-Holder theorem, automorphism groups, infinite abelian groups, free groups, and selected topics in representation theory. Prerequisite: MA 642 or approval of instructor.

744 Matrix Theory II 3 hrs.
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 3 hrs.
A study of the basic theorems for initial value problems. Local existence of solutions, uniqueness of solutions, dependence on parameters, and selected topics. Prerequisite: MA 653.

754 Real Analysis II 3 hrs.
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 3 hrs.
Applications of the residue theorem, the Mittag-Leffler theorem, infinite products, the Weierstrass theorem, functions defined by integrals, conformal mapping, bilinear transformations, the Schwarz-Christoffel transformation, the inverse function theorem, reflection theorems, the Riemann mapping theorem, analytic continuation, Riemann surfaces, and selected topics. Prerequisite: MA 656.

785 Advanced Theory of Probability 3 hrs.
Probability measure, stochastic independence, modes of convergence, limit theorems, and introduction to Brownian motion. Prerequisite: MA 585, 754.

799 Master’s Thesis 3 hrs.
Required each term a student is working and receiving direction on his master’s thesis. A minimum of two terms is required for Plan I M.A. students. A maximum of 9 hours of credit is awarded upon successful completion of the master’s thesis.

Statistics (ST)

Collection and presentation of data; averages, dispersion and skewness; binomial, normal, X^2, 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.
Time series, trends, seasonal and cyclical factors; index numbers; linear and nonlinear regression; rank and Pearson correlations; an introduction to multiple regression and analysis of variance. Prerequisite: ST 287.

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.

197
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 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 Requirements Catalog statement. 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).
112 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.

113 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); Adjunct Professor: Stettler; Associate Research Professor: Hendricks; Assistant Research Professor: 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. Others 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.

| Semester Hours |  
|----------------|---
| General Education Requirements (humanities and social sciences) | 30-36
| Physics—PH 101, 102, 201, 241, 310, 311, 312, 321, 331, 337, 351, 401, 431, one senior lab at 400 level, 551-552 | 43
| Mathematics—MA 153, 154, 233, 244, 251, 352, 453, 521 | 24
| Chemistry—CH 121-123, 125, 126 | 8
| Electives | 20-26

Curriculum II

Natural Science AOC with Emphasis on Physics
### General Education Requirements (humanities and social sciences)

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
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<tbody>
<tr>
<td>Physics—PH 101, 102, 104, 105, 201, 241, 310, 311, 331, 351</td>
<td>28</td>
</tr>
<tr>
<td>Chemistry—CH 121-123, 125, 126, 331, 332, 333, 335</td>
<td>15</td>
</tr>
<tr>
<td>Mathematics—MA 153, 154, 233, 244, 251, 352</td>
<td>18</td>
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<tr>
<td>Biology—BY 113-114, 319, 317 or 354</td>
<td>14</td>
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</tbody>
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#### Curriculum III

AOC with Physics Major for Class B Secondary Professional Teaching Certificate.

### General Education Requirements (humanities and social sciences)

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
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<tbody>
<tr>
<td>Physics—PH 101, 102, 104, 201, 241, 310, 311, 312, 321, 331, 351</td>
<td>29</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>
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**With Chemistry Cluster:**

<table>
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<th>Course</th>
<th>Hours</th>
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<tbody>
<tr>
<td>Chemistry—CH 223, 331, 332, 333, 341, 342 or (335, 336)</td>
<td>15</td>
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<tr>
<td>Education core</td>
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<tr>
<td>Electives</td>
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**With Mathematics Cluster:**

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<th>Course</th>
<th>Hours</th>
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<tr>
<td>Mathematics—MA 333, 442, 385 or 585</td>
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<tr>
<td>Education core</td>
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<td>Electives</td>
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**With Biology Cluster:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology—BY 114-221, 319, 320, 5 hours elective</td>
<td>18</td>
</tr>
<tr>
<td>Education core</td>
<td>21</td>
</tr>
<tr>
<td>Electives</td>
<td>0-1</td>
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</table>
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)

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, electromagnetic phenomena, relativity, waves, quantum nature of matter. 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. 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 3 hrs.
Quantum hypothesis, physical quantities, theory of measurement; uncertainty principle, energy levels; photons; particles, de Broglie waves; phenomenological wave mechanics, Schroedinger's wave equation, hydrogen-like systems, interactions. Prerequisite: PH 241, 331. Spring.

401 Intermediate Mechanics 3 hrs.
Motion of particle in two or three dimensions, central forces, gravitation, systems of particles; rigid body motion; moving coordinate systems; generalized coordinates, Lagrange's equations, Hamilton's equations. Prerequisite: PH 201. Prerequisite or parallel: MA 352. Winter, Summer.

412 Optics and Spectroscopy Laboratory 1 hr.
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 1 hr.
Statistics in counting processes, beta-ray continuum, scintillation spectroscopy, coincidence spectroscopy, Mossbauer effect, selected experiments in modern techniques. Offered upon demand.

414 Solid State Physics Laboratory 1 hr.
Fundamental solid state experiments, including electron paramagnetic resonance, nuclear magnetic resonance, Hall effect, cyclotron resonance, Mossbauer spectroscopy. Offered upon demand.

415 X-Ray Laboratory 1 hr.
Powder and single crystal x-ray photography with theory as needed. Offered upon demand.

416 Senior Laboratory 1 hr.
Selected experiments from PH 412-415.
420 Senior Thesis. 3 hrs.
Semi-original work performed under the direction of a faculty member.

431 Intermediate Electricity and Magnetism 3 hrs.
Development of Maxwell's equations for time-varying fields, basic concepts of AC circuit theory, electric fields in matter, magnetic fields in matter, selected discussions on modern applications of electricity and magnetism. Prerequisite: PH 331, MA 352. Spring.

506 Introduction to Physics of the Solar System 3 hrs.
Development and discussion of the fundamentals necessary for understanding of the solar system and the major modern trends. Prerequisite: PH 552. Offered upon demand. Fall.

521 Thermal Physics 3 hrs.
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. Spring, Summer.

536 Introduction to Space Physics 3 hrs.
Charged particles in electric and magnetic fields, cosmic rays and trapped radiation; introduction to plasmas, including collisions and macroscopic effects. Prerequisite: PH 351, 431. Spring.

541 Optics I 3 hrs.

551 Introductory Quantum Mechanics 3 hrs.
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.

552 Introductory Quantum Mechanics 3 hrs.
Continuation of PH 551. Prerequisite: PH 551. Winter.

561 Introduction to Solid State Physics 3 hrs.
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. Fall.

565 Introduction to Nuclear Physics 3 hrs.
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 3 hrs.
Invariance principles and quantum numbers, symmetry schemes, scattering and reactions, resonances, strong-interaction dynamics, and weak interactions. Prerequisite: PH 552. Spring.

601 Classical Dynamics 3 hrs.
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 3 hrs.
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 3 hrs.
Tensor analysis, matrices and group theory, integral transforms, integral equations, Hilbert space. Prerequisite: PH 607. Winter.

622 Kinetic Theory and Statistical Mechanics 3 hrs.
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. Fall, Spring.

631 Electromagnetic Theory I 3 hrs.

632 Electromagnetic Theory II 3 hrs.

651 Quantum Mechanics I 3 hrs.
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.

652 Quantum Mechanics II 3 hrs.
Identical particles, symmetry principles, time-dependent perturbation theory, variational principles, formal scattering theory. Prerequisite: PH 651. Summer.

661 Intermediate Solid State Physics 3 hrs.
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. Winter.

680–

689 Selected Topics 3 hrs.
Offered upon demand.

702 Advanced Classical Dynamics 3 hrs.
Review of Lagrangian and Hamiltonian dynamics, canonical transformation, Hamilton-Jacobi theory, Lagrangian field theory, selected topics. Prerequisite: PH 601. Offered upon demand.

705 Relativity 3 hrs.
A study of the special and the general theory, with emphasis on a covariant formulation of electrodynamics. Prerequisite: PH 601, 631. Offered upon demand.
723 Kinetic Theory and Statistical Mechanics
Advanced topics in kinetic theory and statistical mechanics. Prerequisite: PH 622. Offered upon demand.

741 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.

753 Advanced Quantum Mechanics
Relativistic wave equations, second quantization, interacting fields, Feynman techniques. Prerequisite: PH 652.

761 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. Spring.

780–789 Selected Topics
Offered upon demand.

792 Physics Seminar
Students report on journal articles or individual research. Prerequisite: PH 552. Two terms required for M.S. students. Fall, Spring.

799 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.

899 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, Fronke; Adjunct Associate Professor: Doane

Department of Industrial and Systems Engineering

Professor: Shannon; Associate Professors: Brown (chairman), Wyskida; Assistant Professors: Cullinane, Ignizio; Adjunct Associate Professor: Bucher

Department of Mechanical Engineering

Professors: Grohse, Kubitza, Liu, Shih, Wu; 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:
Undergraduate 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 computer engineering, electrical engineering, environmental engineering, industrial and systems engineering, mechanical engineering, structural engineering.

A student will be awarded the degree of Bachelor of Science in Engineering upon successful completion of all requirements, including a minimum of 136 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 six categories.

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman Year (36 Semester Hours)</td>
</tr>
<tr>
<td>Chemistry—CH 121, 122, 125</td>
</tr>
<tr>
<td>English Composition—EH 101, 102</td>
</tr>
<tr>
<td>208</td>
</tr>
</tbody>
</table>
Calculus and Analytic Geometry—MA 153, 154, 233
General Physics—PH 101, 102
Engineering Graphics—EG 198
Freshman Seminar—EG 195
Statics—EG 171
Fortran Programming—EG 196

2. Sophomore—Junior—Senior Years (100 Semester Hours)

Core Program (62 Semester Hours)

English:
Literature Survey—EH 205, 240, or 241

Economics:
Principles of Economics—EC 142

Mathematics:
Calculus and Analytic Geometry—MA 251
Introduction to Differential Equations—MA 352

Physics:
Electricity and Magnetism—PH 331, same as EG 307

Engineering Core Program:
Electrical Circuits I—EG 201
Introduction to Industrial Management—EG 220
Fluid Mechanics I—EG 242
Thermodynamics I—EG 252
Particle Dynamics—EG 263
Mechanics of Deformable Bodies—EG 273
Applied Linear Algebra—EG 281
Applied Vector Analysis—EG 282
Nature and Properties of Materials—EG 294
Electronics and Instrumentation Laboratory—EG 301
Electronics and Instrumentation—EG 311
Heat Transfer—EG 344
Fluid-Thermal Systems—EG 350
Operational Methods in Engineering—EG 381
Fluid-Thermal Laboratory I—EG 357
Probability and Engineering Statistics I—EG 390
Numerical Methods and Computations—EG 396
Analysis and Control of Dynamical Processes—EG 487
Analysis of Engineering Systems—EG 488
Introduction to Engineering Design—EG 493
Engineering Design—EG 494

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3. Engineering Options

Students are required to take one of the following options, which are listed under the cognizant departments below:

ELECTRICAL ENGINEERING DEPARTMENT

Computer Engineering Option:

The computer engineering option deals with design, construction, and utilization of digital computers. The hardware and software aspects of the computer are integrated in this option.

Computer Organization and Software Systems I—EG 208 3
Electrical Engineering Laboratory—EG 304 1
Computer Organization and Software Systems II—EG 308 3
Switching Theory—EG 309 3
Electronics I—EG 316 2
Introduction to Digital Computer Design—EG 415 3
Compiler Construction—EG 512 3

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, instrumentation, and computer analysis. Additionally, the student may select advanced undergraduate courses to develop his or her individual and specific interests.

Electrical Engineering Laboratory—EG 304 1
Electrical Circuits II—EG 313 3
Electronics I—EG 316 2
Electrical Networks Laboratory—EG 404 1
Electronics Laboratory—EG 406 1
Electromagnetic Waves—EG 407 3
Electrical Networks—EG 414 3
Electronics II—EG 416 3
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.

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering Economy—EG 321</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Probability and Engineering Statistics II—EG 421</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Systems Analysis—EG 422</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Management Systems Analysis—EG 427</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Introduction to Human Engineering—EG 524</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Operations Research I—EG 525</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

MECHANICAL ENGINEERING DEPARTMENT

Environmental Engineering Option:

The environmental engineering option deals with environmental problems which occur in community and industrial practice. The emphasis is on control and prevention of air, water, and thermal pollution, as well as environmental planning and control.

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering Economy—EG 321</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Fluid-Thermal Laboratory II—EG 359</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Systems Analysis—EG 422</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Environmental Control—EG 550</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Introduction to Environmental Engineering—EG 542</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Introduction to Transport Phenomena—EG 442</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Advanced Fluid Mechanics—EG 554)</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Mechanical Engineering Option:

Mechanical engineers are involved in many fields, including the conversion and utilization of mechanical, electrical, thermal and nuclear energy; the behavior of fluids and gases; the conception and
development of mechanical devices; transportation equipment, production tools, instruments and control systems.

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamics of Rigid Bodies—EG 264</td>
<td>2</td>
</tr>
<tr>
<td>Fluid and Thermal Laboratory—EG 359</td>
<td>1</td>
</tr>
<tr>
<td>Mechanical Laboratory—EG 365</td>
<td>1</td>
</tr>
<tr>
<td>Manufacturing Processes—EG 378</td>
<td>2</td>
</tr>
<tr>
<td>Mechanics and Design of Machine Elements—EG 466</td>
<td>3</td>
</tr>
<tr>
<td>Analysis and Design of Thermal Systems—EG 446</td>
<td>3</td>
</tr>
<tr>
<td>Energy Conversion and Power Generation—EG 552</td>
<td>3</td>
</tr>
<tr>
<td>Intermediate Applied Dynamics—EG 563</td>
<td>3</td>
</tr>
</tbody>
</table>

**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.

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rigid Body Dynamics—EG 264</td>
<td>2</td>
</tr>
<tr>
<td>Structural Analysis I—EG 371</td>
<td>2</td>
</tr>
<tr>
<td>Elements of Structural Design—EG 374</td>
<td>2</td>
</tr>
<tr>
<td>Structural Analysis II—EG 471</td>
<td>2</td>
</tr>
<tr>
<td>Dynamics of Elastic Systems—EG 561</td>
<td>3</td>
</tr>
<tr>
<td>Applied Mechanics of Solids—EG 571</td>
<td>3</td>
</tr>
<tr>
<td>Matrix Methods of Structural Mechanics—EG 572</td>
<td>3</td>
</tr>
</tbody>
</table>

**4. 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.

**5. Electives in Humanities and Behavioral Sciences**

Engineering students are required to take 6 semester hours of courses in
the humanities: art, literature, history, music, or philosophy, and 6 semester hours of courses in the social sciences: sociology, psychology, political science, geography, or 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.

6. 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 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
- Management Control Sciences
- Operations Research
- Thermodynamics, heat and mass transfer
- Fluid Mechanics
- Systems Engineering
- Environmental Engineering
- Solid Mechanics
- Dynamics

For 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 baccalaureate degree in a curriculum which was accredited by the Engineers' Council for Professional Development at the time the degree was conferred.

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.

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 probationally 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.

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 Masters 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.
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, and the Dean of 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 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 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)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>097</td>
<td>Engineering Drawing</td>
<td>No credit</td>
<td>Instruction and practice in the graphical representation of objects, using both mechanical and freehand techniques, with emphasis on the principles involved and their use in design. Topics include: isometric and oblique pictorial views; multiview projection on principal and auxiliary planes; dimensioning; fits and tolerances; detail and assembly working drawings. Prerequisite or parallel: MA 153 or evidence of previous instruction in mechanical drawing.</td>
</tr>
<tr>
<td>171</td>
<td>Statics</td>
<td>2 hrs.</td>
<td>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 154.</td>
</tr>
<tr>
<td>195</td>
<td>Freshmen Seminar</td>
<td>1 hr.</td>
<td>Required of all freshmen. Not open to upperclassmen.</td>
</tr>
<tr>
<td>196</td>
<td>FORTRAN Programming</td>
<td>2 hrs.</td>
<td>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.</td>
</tr>
</tbody>
</table>
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. Prerequisite: EG 097 or placement test.

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.

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. Same as CS 208.

220 Introduction to Industrial 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.

242 Fluid Mechanics I 2 hrs.
Properties of fluids and fundamental principles governing fluid motion, including fluid statics, conservation of mass, momentum and energy with applications to pipe and channel flows of incompressible fluids. Prerequisites: EG 263, MA 251.

252 Thermodynamics I 2 hrs.
Properties of matter, state variables, equilibrium, reversible processes, first and second laws with applications to closed systems. Prerequisite: MA 251, CH 122.

263 Particle Dynamics 2 hrs.
Kinematics of a particle, Newton’s laws, linear and angular momentum, work and energy, conservation laws, relative motion. Laboratory experiments and demonstrations are included. Prerequisite: EG 171. Parallel: MA 233.

264 Rigid Body Dynamics 2 hrs.
Kinematics and kinetics of rigid body motions in the plane and in space. Euler’s equations. Laboratory experiments included with lectures. Prerequisite: EG 263. Parallel: MA 251.

273 Mechanics of Deformable Bodies 3 hrs.
A study of mechanical behavior of solids with applications to fundamental problems of extension, torsion, flexure and buckling of bars. Laboratory experiments and demonstrations are included with the lectures. Prerequisite: EG 171, MA 251.
281 Applied Linear Algebra 2 hrs.
Introduction to the algebra of matrices and n-dimensional linear spaces, forms, mappings, transformations and invariants, and applications. Prerequisite: MA 251. Not open for credit to students who have taken MA 244.

282 Applied Vector Analysis 2 hrs.
Introduction to vector field theory, line and surface integrals, theorems of Green, Gauss and Stokes. Prerequisite: 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 122, 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.

304 Electrical Engineering Laboratory 1 hr.
Experiments related to electrical and electronic circuits and to apply and verify the principles presented in EG 313 and 316. Prerequisite or parallel: EG 313, 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, 282, PH 102.

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: EG 208. Same as CS 308.

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.

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, and replacement analysis. Prerequisite: EC 142, MA 154.

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.

350 Fluid-Thermal Systems 2 hrs.
Analyses 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.

352 Thermodynamics II 3 hrs.
Irreversibility, availability, chemical reactions, phase and chemical equilibrium. Basic relationships among properties. Prerequisite: EG 252.

357 Fluid-Thermal Laboratory I 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.

359 Fluid-Thermal Laboratory II 1 hr.
Continuation of EG 357 with in-depth experimentation and analysis. Experiments include determination of thermodynamic and transport properties, verification of gas laws, and the demonstration of conservation principles and similitude. Prerequisite: EG 357.

365 Mechanical Laboratory 1 hr.
Laboratory in mechanical systems, mechanisms for transmitting motion, force, and power; dynamics of vibrations; and balancing of machines; strength of materials and failure of machine elements. Meets twice weekly. Prerequisite or parallel: EG 466.

371 Structural Analysis I 2 hrs.
Reactions, shears, moments in determinate structures. Influence lines, energy methods in computing deformations. Prerequisite: EG 263, 273.

374 Elements of Structural Design 2 hrs.
Basic principles of structural design of metallic and non-metallic structures. Analysis and design of structural elements, including beams, columns and connection details. Prerequisite: EG 371.

378 Materials and Manufacturing Processes 2 hrs.
Processes and operations in manufacturing. Selection of materials and methods of forming and fabrication with emphasis on current industrial practice. Field trip included. Prerequisite: EG 294.
381 Operational Methods in Engineering 2 hrs.
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, 281.

390 Probability and Engineering Statistics I 3 hrs.
An introduction to probability theory, estimation, sampling, and hypothesis testing. Prerequisite or parallel: MA 251.

394 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. Same as ES 304.

396 Numerical Methods and Computations 2 hrs.
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.

404 Electrical Networks Laboratory 1 hr.
Experiments that apply and verify the principles presented in EG 381 and 414. Prerequisite or parallel: EG 414.

406 Electronics Laboratory 1 hr.
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 304 and must parallel with EG 416.

407 Electromagnetic Waves 3 hrs.
Transient waves, steady state waves on transmission lines, Smith chart, line matching, plane waves and waveguides. Laboratory experiments 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 Electrical Networks 3 hrs.
Driving point and transfer functions, frequency response of networks; Bode plots; introduction to filter theory. 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 EG 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.
<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
<th>Prerequisite(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>421</td>
<td>Probability and Engineering Statistics II</td>
<td>3 hrs.</td>
<td>A continuation of EG 390 with emphasis on analysis of variance, regression analysis, correlation, and non-parametric statistics. Includes computer solution of large scale problems. Prerequisite: EG 390.</td>
<td></td>
</tr>
<tr>
<td>422</td>
<td>Systems Analysis</td>
<td>2 hrs.</td>
<td>An introduction to the philosophy and methods of organization, industrial and urban systems analysis. A systems approach to such complex problems as pollution, transportation, and urban decay is discussed. Methods of formulating such problems, identifying relevant factors, methods of simplification and provision of control and information feedback are presented and illustrated. A group design project is required. Prerequisite: MA 251 and senior standing.</td>
<td></td>
</tr>
<tr>
<td>442</td>
<td>Introduction to Transport Phenomena</td>
<td>3 hrs.</td>
<td>The study of fluid flows and processes in which molecular and eddy transport effects due to the viscosity, thermal conductivity, and mass diffusivity are important. Topics include convective heat transfer, boiling and condensation, and mass diffusion. Prerequisite: EG 344, EG 350.</td>
<td></td>
</tr>
<tr>
<td>446</td>
<td>Analysis and Design of Thermal Systems</td>
<td>3 hrs.</td>
<td>Application of the principles of heat transfer, thermodynamics, and fluid mechanics to the analysis and design of systems in which heat transfer plays an important role. Topics include convective heat transfer, heat exchangers, systems for heating and air conditioning. Prerequisite: EG 344, 350.</td>
<td></td>
</tr>
<tr>
<td>458</td>
<td>Fluid-Thermal Laboratory III</td>
<td>1 hr.</td>
<td>Continuation of EG 359 dealing with more sophisticated techniques and instrumentation, applied to more complex phenomena. Completion of student conceived experiments or project is an essential part of this course. Prerequisite: EG 359. Parallel: EG 441.</td>
<td></td>
</tr>
<tr>
<td>487</td>
<td>Analysis and Control of Dynamical Processes</td>
<td>2 hrs.</td>
<td>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.</td>
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</tbody>
</table>
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 of fabricating processes; specifications and assumptions underlying engineering design. Prerequisite: EG 273, 311, 350.

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 Computers 3 hrs.
Design of an operational integrator. Analog computer solution of engineering problems represented by linear and nonlinear differential equations encountered in vibration analysis, flow problems, automatic controls, electrical network theory and concept of transfer function simulation. Laboratory Sessions. Two credit hours for lecture and one credit hour for laboratory. Prerequisite: EG 311 and 381 or senior standing.

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.
<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>512</td>
<td>Compiler Construction</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>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 308 or 511. Same as CS 512.</td>
<td></td>
</tr>
<tr>
<td>513</td>
<td>Digital Computer Systems</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>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.</td>
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</tr>
<tr>
<td>516</td>
<td>Advanced Electronics</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>Non-sinusoidal generating and wave-shaping circuits, timing circuits, limiters, comparators, clampers, logic gates, multivibrators and voltage-controlled oscillators. Prerequisite EG 316.</td>
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</tr>
<tr>
<td>522</td>
<td>Logistics Planning and Control</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>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.</td>
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</tr>
<tr>
<td>523</td>
<td>Statistical Quality Control</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>A study of statistical theory and techniques used to control the quality of manufactured products. Prerequisite: EG 390, EG 621 or AS 628.</td>
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<tr>
<td>524</td>
<td>Introduction to Human Engineering</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>An introduction to the philosophy, methodology and techniques of human engineering as related to the optimum design and analysis of man-machine systems. Includes laboratory work and computer applications in human engineering. Prerequisite: EG 421.</td>
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</tr>
<tr>
<td>525</td>
<td>Operations Research I</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>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 AS 628 or MA 585.</td>
<td></td>
</tr>
<tr>
<td>526</td>
<td>Design and Analysis of Experiments</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>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 or AS 628.</td>
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</tr>
<tr>
<td>527</td>
<td>Systems Simulation</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>Methods and procedures for simulation of complex systems. Both discrete increment and continuous time models are considered. Prerequisite: EG 196, 525.</td>
<td></td>
</tr>
<tr>
<td>540</td>
<td>Physical Properties of Fluids</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>Development and study of theoretical, experimental, and correlation</td>
<td></td>
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</tbody>
</table>
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 352. Offered upon demand.

542 Introduction to Environmental Engineering 3 hrs.
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 3 hrs.
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 350.

550 Environmental Control 3 hrs.
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, water pollution control, and desalination. Prerequisite: EG 442.

552 Energy Conversion and Power Generation 3 hrs.
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 350.

554 Advanced Fluid Mechanics 3 hrs.
Development of the fundamental equations of fluid mechanics, with applications to two- and three-dimensional flows. Topics include stream functions, vorticity, potential functions, viscous flows, and flows in open channels. Prerequisite: EG 282, 350.

558 Dimensional Analysis and Similitude 3 hrs.
Nature and use of dimensions; principles of dimensional analysis; systematic calculation of dimensionless products, algebraic theory of dimensional analysis, similarity and model testing; applications to problems of stress and strain, dynamics, fluid mechanics, theory of heat, and electrical phenomena; differential equations and similarity. Prerequisite: EG 554. Offered upon demand only.

559 Selected Topics in Fluid and Thermal Engineering Credit to be arranged

561 Vibrations of Elastic Systems 3 hrs.
Dynamic response of mechanical systems: transient, oscillatory, and wave motions, flutter, and stability. Prerequisite: EG 488.

563 Intermediate Dynamics 3 hrs.
Newtonian and Lagrangian methods applied to particles, rigid bodies and
mechanical systems. Topics include balancing of rotating masses and gyroscopic motion. Prerequisite: EG 264.

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.

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
A continuation of EG 608. Prerequisite: EG 608.

610 Selected Topics in Electrical Engineering
Credit to be arranged.

611 Antenna Theory
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 Network Analysis
The analysis of networks using matrix algebra, network topology, and
transform methods. Network theorems, filters, and introduction to flow
graphs. Prerequisite: EG 414.

615 Network Synthesis
Methods of Bott-Duffin, Brune, Cauer, Darlington, Foster, etc. studied.
Filter synthesis with Butterworth and Chebyshev functions. Realizability
of networks. Prerequisite: EG 614.

618 Microwave Techniques
Network representations and analysis of microwave devices. Discontinuities
from a circuit point of view. Symmetry considerations. Scattering matrices
in circuit design. Cavity resonators. Prerequisite: EG 609.

619 Advanced Linear Control Theory
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 sys-
tems. Prerequisite: EG 505.

620 Concepts of Industrial Management I
A study of the principles of the executive process in industrial organiza-
tions. Emphasis upon the basic management functions, scientific manage-
ment, planning, directing, controlling, and decision making, as they relate
to the management of industrial organizations and the design and
implementation of management systems. Prerequisite: graduate standing.

621 Statistical Methods for Engineers
Designed to introduce graduate students to the applications of probability
and statistics useful in research work. Includes descriptive statistics,
thetheoretical distribution functions, point and interval estimation, tests of
hypotheses, linear regression, and analysis of variance. Not open to
students who have taken EG 390 or 421. Prerequisite: MA 251 and
graduate standing.

622 Research and Development Management
Deals with those problems which are unique to the management of
organizations engaged in R&D activities. Topics discussed include manage-
ment 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 Advanced Engineering Economy
Mathematical models for expenditure analysis under uncertainty. Relation-
ship between investment decision criteria and microeconomic theory.
Capital planning and budgeting. Decisions involving expansion, acquisitions, replacement, and disinvestment. Prerequisite: EG 321, EG 421, EG 525.

624 Advanced Human Engineering 3 hrs.
Design, analyses and evaluation of man-machine 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: queuing theory, theory of games; Markov processes, sequencing and coordination problems. A team project is also required. Prerequisite: EG 421 and 525 or AS 628.

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 or AS 628.

628 Concepts of Industrial Management II 3 hrs.
Deals with the organizational and human relations aspects of industrial 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.

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 or AS 628.

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, 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 352.

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, Eulerian and Lagrangian formulations, 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 theological 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 technolog-
ical 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 3 hrs.
Navier-Stokes equations, including several exact solutions and several approximate solutions for both large and small Reynolds 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.

661 Advanced Dynamics 3 hrs.
Special theory of relativity, Hamilton's equations, canonical transformations, Hamilton-Jacobi theory. Lagrangian and Hamiltonian formulation for continuous systems. Prerequisite: EG 560, 692.

663 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 560.

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.

672 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.

676 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.

677 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.
690 Operating Systems
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.

691 Theory of Programming Languages
Syntactic analysis and semantic interpretation of formal languages and the associated compiler techniques as utilized in current procedure oriented compilers. Prerequisite: EG 511 or 513. Same as CS 691.

692 Graduate Engineering Analysis I
Linear algebra, linear transformations and matrices, vector analysis and introduction to tensors; selected applications. Prerequisite: MA 244 or EG 282.

693 Graduate Engineering Analysis II
Partial differential equations, integral equations, applications and approximation. Prerequisite: EG 692.

695 Graduate Seminar II
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.

700 Sampled Data Control Systems
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
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.

704 Nonlinear Control Systems
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
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

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 of the techniques of 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 3 hrs.

747 Advanced Heat Transfer 3 hrs.

752 Mechanics of Rarefield Gases 3 hrs.
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 541. Offered upon demand.

753 Magneto-Gas Dynamics 3 hrs.
Equations of motion for ionized gases with critical analysis of transport properties in steady and varying electric and magnetic fields, MHD shock waves and radiation effects. Prerequisite: EG 640.

756 Viscous Flow and Convective Heat Transfer II 3 hrs.
Boundary layers in compressible flow; adiabatic, heated, and cooled walls; aerodynamic heating; shock-wave boundary layer interactions. Prerequisite: EG 656.

757 Turbulence 3 hrs.
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 660, 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

773 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.

795 Graduate Seminar II
Preparation and presentation of papers on topics of research interest related to thesis study. Parallel to EG 799.

799 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.

899 Doctoral Dissertation
3 or 6 hrs.
School of Nursing

Dean: Dr. Kathryn Crossland, Professor of Nursing;
Chairman, Lower Division: Mrs. Ruth C. Merrill, Assistant Professor.


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. An advisor will be assigned to each student to help guide him throughout the program.

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 medical and nursing 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.

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>
<th>Semester Hours</th>
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<tbody>
<tr>
<td>Natural Science (Biology, Chemistry, Physics)</td>
<td>12</td>
</tr>
<tr>
<td>Human Ecology (Physiology, Microbiology, Epidemiology, Immunology)</td>
<td>8</td>
</tr>
<tr>
<td>Statistical Concepts (A statistics course offered in any division will meet this requirement.)</td>
<td>3</td>
</tr>
<tr>
<td>Mathematics (MA 105 or Level II)</td>
<td>3</td>
</tr>
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<td>26</td>
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</table>

Social and Behavioral Sciences:

| Sociology and Psychology (Two courses in one of the fields and one course in the other field.) | 9 |
| Electives                                                                   | 9 |
|                                                                          | 18 |

Humanities:

| English Composition                                                   | 6 |
| Literature or History                                                | 6 |
| Electives                                                            | 6 |
|                                                                      | 18 |
Upper Division

<table>
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<tr>
<th>Semester Hours</th>
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</thead>
<tbody>
<tr>
<td>Nursing:</td>
</tr>
<tr>
<td>Bases of Nursing Practice</td>
</tr>
<tr>
<td>Episodic Nursing</td>
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<tr>
<td>Distributive Nursing</td>
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<tr>
<td>Nursing Functions in Delivery of Health Services</td>
</tr>
<tr>
<td>Independent Study</td>
</tr>
<tr>
<td>Electives</td>
</tr>
</tbody>
</table>

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)

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>381</td>
<td>Bases of Nursing Practice, I</td>
<td>8 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
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</tr>
<tr>
<td>382</td>
<td>Bases of Nursing Practice, II</td>
<td>8 hrs.</td>
</tr>
<tr>
<td></td>
<td>Focuses upon critical employment of the nursing process in individualized, personalized care of patients in a variety of settings which includes family health.</td>
<td></td>
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<tr>
<td>383</td>
<td>Bases of Nursing Practice, III</td>
<td>8 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
</tbody>
</table>
390 Independent Study 2-4 hrs.
Individualized independent study of a specific nursing problem under the sponsorship of a nursing faculty member with special preparation in the field. Elective only.

433 Advanced Cardiovascular Nursing 3 hrs.
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. Prerequisites: Nursing 481 and 482. Elective.

435 Advanced Clinical Psychiatric Nursing 3 hrs.
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 Nursing 481 by providing clinical applications as well as expansion of the theoretic base of psychiatric nursing. Prerequisites: Nursing 481 and 482. Elective.

441 Independent Study 4 hrs.
Student initiated, faculty guided experience or research to support selected functional role. NUR 443 is prerequisite or may be concurrent.

443 Nursing Functions in Delivery of Health Services 4 hrs.
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.

481 Episodic Nursing 8 hrs.
Nursing patients with complex medical, surgical and psychiatric conditions requiring episodes of hospitalization.

482 Distributive Nursing 8 hrs.
Family focused nursing care in homes, ambulatory centers and health agencies with emphasis on maternal, child, and mental health situations.
Library Research for Undergraduates

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)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Introduction to Libraries and Bibliography</td>
<td>2 hrs.</td>
</tr>
<tr>
<td></td>
<td>Systems of library retrieval and their use; construction of bibliographies and footnotes; major reference materials and library resources of the area in various subjects.</td>
<td></td>
</tr>
<tr>
<td>310</td>
<td>Bibliography of British and American Philology</td>
<td>1 hr.</td>
</tr>
<tr>
<td></td>
<td>Origin and terminology of the subject; its production and utilization of information; its reference and research materials.</td>
<td></td>
</tr>
<tr>
<td>318</td>
<td>Bibliography of Romanic Philology</td>
<td>1 hr.</td>
</tr>
<tr>
<td></td>
<td>Origin and terminology of the subject; its production and utilization of information; its reference and research materials.</td>
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</tr>
<tr>
<td>320</td>
<td>Bibliography of American History</td>
<td>1 hr.</td>
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<tr>
<td></td>
<td>Origin and terminology of the subject; its production and utilization of information; its reference and research materials.</td>
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</tr>
<tr>
<td>345</td>
<td>Bibliography of the Health Sciences</td>
<td>1 hr.</td>
</tr>
<tr>
<td></td>
<td>Origin and terminology of the subject; its production and utilization of information; its reference and research materials.</td>
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<tr>
<td>360</td>
<td>Bibliography of Behavioral Science</td>
<td>1 hr.</td>
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<tr>
<td></td>
<td>Origin and terminology of the subject; its production and utilization of information; its reference and research materials.</td>
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<tr>
<td>380</td>
<td>Bibliography of Music</td>
<td>1 hr.</td>
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<tr>
<td></td>
<td>Origin and terminology of the subject; its production and utilization of information; its reference and research materials. Alternate years.</td>
<td></td>
</tr>
<tr>
<td>385</td>
<td>Bibliography of Art</td>
<td>1 hr.</td>
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<tr>
<td></td>
<td>Origin and terminology of the subject; its production and utilization of information; its reference and research materials. Alternate years.</td>
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</tr>
<tr>
<td>400</td>
<td>Theory of Bibliographical Order</td>
<td>2 hrs.</td>
</tr>
<tr>
<td></td>
<td>General structures of systems of bibliographical order: hierarchical trees, &quot;alphabetical&quot; files, juxtaposition and syndesis, facet analysis, thesauri. Prerequisite: BIB 100 or admission to an MLS program.</td>
<td></td>
</tr>
</tbody>
</table>
School of Primary Medical Care

Dean: G. Gayle Stephens, Professor of Family Medicine
Assistant Dean for Clinical and Student Affairs: Silas W. Grant, Professor of Family Medicine

Allied Health
Adjunct Instructors: Campbell, Kohr

Family Medicine
Professors: Grant, Stephens; Assistant Professor: Smith; Instructor: Brown

Medical Sociology
Professor: McCalister

Pediatrics
Associate Professor: Johnston; Instructor: Quirante

Clinical Faculty: approximately 110 physicians practicing in North Alabama

The UAH School of Primary Medical Care is a developing 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, 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 portions of their Core Clinical Experience (Phase II) and their Individualized Experience (Phase III) at the Huntsville and Tuscaloosa campuses. UAH received its first undergraduate medical students during the 1973 Fall Term.
Correspondence pertaining to admission to the tri-campus Medical Education System should be addressed to: Director of Admissions, School of Medicine, University of Alabama in Birmingham, 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 will concentrate 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 four residents between November, 1973, and February, 1974; more family practice residents will be added in July of 1974. 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.

Program

Clerkships and Electives

The UAH School of Primary Medical Care will offer a Phase II Clinical Clerkship in Pediatrics as of July, 1974, and Phase II Clinical Clerkships in Internal Medicine, Surgery, Obstetrics and Gynecology, and Psychiatry later in the 1974-75 academic year. These Clinical Clerkships will be 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. The wide range of Phase III Electives offered by the UAH School of Primary Medical Care is 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.
Primary Care Pilot Program

The University of Alabama School of Medicine is developing at UAH a pilot program specifically designed for undergraduate work in primary care. Of the students matriculating at the School of Medicine in July, 1975, approximately twelve will be selected during the general admission process to follow this special primary health care program at UAH. Plans are under consideration for certain primary care learning experiences to be offered to these students while they are in the Correlated Basic Medical Science program at Birmingham. During their Phase II and Phase III experience, students in the special primary care program will be based at Huntsville, where School of Primary Medical Care faculty and facilities will be geared to the pilot curriculum. Prospective School of Medicine students interested in this special primary care pilot program should address inquiries to:

Primary Care Pilot Program
Office of the Dean
School of Primary Medical Care
The University of Alabama in Huntsville
P.O. Box 1247
Huntsville, Alabama 35807

Family Practice Residency

The basic aim of the family practice residency of the UAH School of Primary Medical Care and Huntsville Hospital is to alleviate the urgent need for family physicians, particularly in North Alabama. While the family practice residents are based primarily at the UAH-Huntsville Hospital Family Practice Center and at Huntsville Hospital, a 456-bed facility, the UAH-Huntsville Hospital family practice residency augments and draws upon the health resources not only of Madison County, but of towns of varying sizes throughout North Alabama. This 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-Huntsville Hospital 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-Huntsville Hospital family practice residency is designed to encourage individual initiative in planning 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, School of Primary Medical Care, The University of Alabama in Huntsville, P.O. Box 1247, Huntsville, Alabama 35807

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 being planned for both the UAH campus and the Huntsville medical district. A University Health Service, to be housed in the first of three projected buildings for the medical school, is being 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, has been in operation in temporary quarters in the Huntsville Medical District since March of 1973. This model family practice unit provides residents and students with essential clinical experience in treating a spectrum of 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 will be permanently located in the medical school Ambulatory Care Center, scheduled for completion in 1975 near Huntsville Hospital in the Medical District. The second School of Primary Medical Care building on the UAH campus will be an academic center containing an administrative area, student areas, a learning center, and facilities for faculty research.

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 said 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) — Mathematics, Developmental Learning
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.

In addition he must request that:

1. Two copies of previous academic records be sent from each collegiate institution attended to UAH Admission and Records Office.
2. Scores of the Graduate Record Examination (GRE) be sent to UAH Admission and Records Office from Educational Testing Service (ETS).
3. Three former professors (or other individuals qualified to judge competence for graduate study) submit to UAH Admission and Records Office completed “Evaluation of Fitness for Graduate Study Forms.”
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 Admission 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.

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 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.
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 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 Admission 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.

Students majoring in mathematics and physics may follow Plan One or Plan Two; students majoring in administrative science must follow Plan Two; students majoring in chemistry must follow Plan One.

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. Evaluation of credit for transfer will be made on request after the student has completed 12 semester hours of graduate credit at The University of Alabama. Students who have graduate credits from other units of the University of Alabama mus
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 Admission 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 250. 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.
Coordinator of Administrative Studies: Richard H. Shuford, Jr.

The mission of the Division of Continuous Education is to apply university-level capabilities in meeting educational needs 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

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 requested to be accepted into the regular records, subject to the standard regulations governing transfer credit.
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.

Applications for non-credit courses may be completed during registration. In general, these courses are open to all mature 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 now maintained by the Continuous Education Division.

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.

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 programs in selected areas.

The associate programs involve approximately one-half of the credit required for a bachelor's degree. Thus, it should be clear that these programs do not provide the same level of career preparation as the standard degree programs. However, credit earned in the associate 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 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.

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 against the General Education Requirements for the higher degree. In each of the above groups, the course marked "a" are acceptable in all 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 204, 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

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 6 hours from ID 201, ID 301, or ARH 309, and ID 302

Supporting Courses: ART 101, ART 121, plus two studio art courses from two areas (design, drawing, photography, or sculpture) required; remaining courses from ART 300, ART 303, and ART 304

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.

Persons interested in pursuing a basic certificate should contact the Division of Continuous Education concerning the specific curricula that are available.

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 now offers a new type of continuing education activity: the Post-Graduate Certificate Program. Departing from tradition, this program combines some of the best features of informal continuing education courses and graduate 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- and 600-level 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, curricula may be developed for post-graduate certificates in general administration, program management, contract administration, and industrial administration. In the technology field, curricula in general technology, sensor systems technology, electronics technology, and aero-mechanical technology may currently be developed.

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

The primary distinction between this program and standard graduate programs is embodied in their respective objectives. The post-graduate certificate program has as its major objective the presentation of theories, concepts, and techniques to keep professional personnel proficient in their fields. The most important objective of standard graduate programs is to develop students' abilities in reasoning processes, with applications to indepth examinations of discipline areas.

Obviously, there is an overlapping of courses appropriate for both types of programs, and 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 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 in the post-graduate certificate program are 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 Program

The Division of Continuous Education has a co-op program that is
available to a limited number of undergraduate students. The program is designed to supplement the traditional undergraduate activities, giving the student practical experience in his or her chosen field.

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.

For additional information, contact 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 3 hrs.
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 3 hrs.
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 3 hrs.
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 3 hrs.
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.

204 Family Relationships 3 hrs.
Course designed to help the student gain an understanding of the dynamics of family interaction and their effects upon the child. The family as a social system; communications within the family; effects on family members of the working mother; problems of low-income families; family crises.

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. Principles of design, furniture arrangement, basic color schemes, floor and wall-coverings, lighting, decorative fabrics, window treatments, and selection of furniture and accessories.

102 Introduction to Interior Decoration 3 hrs.
A course designed to guide the student to an intelligent understanding of what is beautiful and useful in the design, furnishing, decoration, and equipment for all types of rooms; an introduction to the principles and practices of interior decoration. Prerequisite: ID 101 or permission of instructor.

201 Introductory Architectural Planning 3 hrs.
Survey of architectural planning and drawing, primarily as these topics relate to interior decoration. Basic practices of construction; types of construction materials; reading blueprints; preparation of layout sketches and drawings.
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<th>Course Code</th>
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<th>Credits</th>
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<tr>
<td>202</td>
<td>Interior Decoration Problems</td>
<td>3 hrs.</td>
<td>Detailed study of problems in interior decoration; practical applications in combining furnishings, materials, and finishes; practice in decorating complete rooms. Prerequisite: ID 102.</td>
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<tr>
<td>301</td>
<td>Period Interiors</td>
<td>3 hrs.</td>
<td>A study of interior spaces, furniture, fabrics, and accessories from pre-Renaissance to contemporary times. Illustrated lectures, readings, reports, and field trips. Prerequisite: ID 102 or permission of instructor.</td>
</tr>
<tr>
<td>302</td>
<td>Interior Rendering Techniques</td>
<td>3 hrs.</td>
<td>Problems in presenting historic and contemporary interiors in one- and two-point perspective. Prerequisite: ID 201 or permission of instructor.</td>
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<td><strong>Law Enforcement (LE)</strong></td>
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<tr>
<td>101</td>
<td>Introduction to Criminal Justice</td>
<td>3 hrs.</td>
<td>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.</td>
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<tr>
<td>102</td>
<td>Law Enforcement Operations</td>
<td>3 hrs.</td>
<td>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.)</td>
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<tr>
<td>201</td>
<td>Investigation and Evidence</td>
<td>3 hrs.</td>
<td>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.</td>
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<tr>
<td>203</td>
<td>Introduction to Criminalistics</td>
<td>3 hrs.</td>
<td>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.</td>
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The following courses are open to students who have completed LE 101 (or the equivalent) or who have upper-division standing.

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<tr>
<td>301</td>
<td>Crime and Delinquency</td>
<td>3 hrs.</td>
<td>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.</td>
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<tr>
<td>303</td>
<td>Criminal Law</td>
<td>3 hrs.</td>
<td>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.</td>
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270
304 Criminal Procedure 3 hrs.
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 3 hrs.
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 3 hrs.
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.

502 Statistical Techniques 3 hrs.
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.

503 Introduction to Operations Research 3 hrs.
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.

504 Management Processes 3 hrs.
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.

507 Decision Accounting 3 hrs.
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.

521 Fundamentals of Program Management 3 hrs.
Intensive survey of the principles and techniques involved in the management of technical programs.
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<tr>
<td>523</td>
<td>Configuration Management</td>
<td>3 hrs.</td>
<td>Study of the needs, concepts, and applications of configuration identification, control, and status accounting as related to hardware and documentation.</td>
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<td>524</td>
<td>Cost Modeling and Estimating</td>
<td>3 hrs.</td>
<td>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.</td>
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<tr>
<td>525</td>
<td>Planning and Control Techniques</td>
<td>3 hrs.</td>
<td>Study of the management methodology of network-based planning and control; detailed analysis of CPM, PERT, and GERT; computer procedures for complex networks.</td>
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<td>541</td>
<td>Fundamentals of Contract Administration</td>
<td>3 hrs.</td>
<td>Intensive survey of the principles and practices involved in the administration of contracts by and from federal agencies.</td>
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<tr>
<td>543</td>
<td>Financial Aspects of Contracts</td>
<td>3 hrs.</td>
<td>Study of contract pricing techniques; financing of government contracts; allowable, disallowable, and allocable costs; indirect rate determinations; accounting methods; contract closings.</td>
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<tr>
<td>544</td>
<td>Contract Writing</td>
<td>3 hrs.</td>
<td>Study of writing techniques for REP's, proposals, negotiation memoranda, contracts, subcontracts, contract changes, progress reports, and other contract-related documents.</td>
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<td>545</td>
<td>Contract Changes and Terminations</td>
<td>3 hrs.</td>
<td>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.</td>
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<tr>
<td>546</td>
<td>Contract Negotiation</td>
<td>3 hrs.</td>
<td>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.</td>
</tr>
<tr>
<td>561</td>
<td>Fundamentals of Public Administration</td>
<td>3 hrs.</td>
<td>Intensive survey of the principles and practices involved in the administration of governmental organizations.</td>
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<tr>
<td>581</td>
<td>Fundamentals of Industrial Administration</td>
<td>3 hrs.</td>
<td>Intensive survey of the principles and practices involved in the administration of industrial organizations.</td>
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</table>
582 Industrial Personnel Administration 3 hrs.
Study of personnel administration in an industrial organization: selection, training, and placement of personnel; merit training and promotion; salary and wage administration.

583 Industrial Labor Relations 3 hrs.
Detailed study of labor laws, management-labor problems, organization and structure of labor unions, collective bargaining procedures and techniques, and union-management contracts.

584 Production Management 3 hrs.
Study of the theory and application of demand forecasting, production and inventory planning and control, and product quality control. Prerequisite: college-level algebra.

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.

501 Foundations of Modern Technology I 3 hrs.
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 up-dating previous training.

502 Foundations of Modern Technology II 3 hrs.
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 3 hrs.
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 3 hrs.
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 3 hrs.
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 3 hrs.
Intensive survey of the generation, transmission, and detection of infrared radiation, with emphasis on military and remote sensing applications.
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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>513</td>
<td>Guidance Technology</td>
<td>3 hrs.</td>
<td>Intensive survey of trajectory theory, stability and control theory, guidance and optimization theory, and modern guidance techniques and systems.</td>
</tr>
<tr>
<td>514</td>
<td>Rocket Propulsion Technology</td>
<td>3 hrs.</td>
<td>Intensive survey of rocket propulsion theory, techniques, systems, and components. Appropriate for both specialists and non-specialists. Prerequisite: knowledge of basic thermodynamics.</td>
</tr>
<tr>
<td>515</td>
<td>Instrumentation Technology</td>
<td>3 hrs.</td>
<td>Intensive survey of the theory and application of modern electronic instruments and instrumentation systems. Appropriate for engineers and scientists in all fields.</td>
</tr>
<tr>
<td>516</td>
<td>Laser Technology</td>
<td>3 hrs.</td>
<td>Intensive survey of laser principles and systems with an emphasis on practical aspects, particularly in space and military applications.</td>
</tr>
<tr>
<td>517</td>
<td>Nuclear Technology</td>
<td>3 hrs.</td>
<td>Intensive survey of the principles of nuclear energy, nuclear power systems, nuclear weapons, radiation effects, and radiation shielding.</td>
</tr>
<tr>
<td>518</td>
<td>Simulation and Modeling Technology</td>
<td>3 hrs.</td>
<td>Intensive survey of simulation methodology with applications to systems analysis and synthesis. Prerequisite: basic knowledge of computer programming.</td>
</tr>
<tr>
<td>519</td>
<td>Digital Electronics Technology</td>
<td>3 hrs.</td>
<td>Intensive survey of the analysis and design of digital logical circuits using discrete and integrated elements. Prerequisite: knowledge of basic electronic circuits.</td>
</tr>
<tr>
<td>520</td>
<td>Heat Transfer Technology</td>
<td>3 hrs.</td>
<td>Intensive survey of heat transfer theory, applications, and devices, particularly as related to missiles and spacecraft. Prerequisite: knowledge of basic thermodynamics.</td>
</tr>
<tr>
<td>521</td>
<td>Flight Structures Technology</td>
<td>3 hrs.</td>
<td>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.</td>
</tr>
<tr>
<td>523</td>
<td>Image Processing Technology</td>
<td>3 hrs.</td>
<td>Intensive survey of the theory, hardware, and application of optical and digital image processing, coding, and transmission. Prerequisite: basic knowledge of data processing.</td>
</tr>
<tr>
<td>524</td>
<td>Communication Systems Technology</td>
<td>3 hrs.</td>
<td>Intensive survey of theories and techniques involved in analog and digital communication systems. Prerequisite: knowledge of basic electrical theory.</td>
</tr>
<tr>
<td>525</td>
<td>Optics Technology</td>
<td>3 hrs.</td>
<td>Intensive survey of the principles of optics and their applications in modern devices and systems.</td>
</tr>
</tbody>
</table>
551 **High-Energy Astronomy**  
3 hrs.  
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**  
3 hrs.  
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**  
3 hrs.  
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**  
3 hrs.  
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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Dean, School of Humanities and Behavioral Sciences

Norman J. Bucher, B.S., M.S., Ph.D.
Assistant Dean, School of Humanities and Behavioral Sciences

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Dean, School of Science and Engineering

N.F. Audeh, B.S., M.S., Ph.D.
Assistant Dean, School of Science and Engineering

Kathryn M. Crossland, B.S.N., M.S., Ed.D.
Dean, School of Nursing

G. Gayle Stephens, B.S., M.D.
Dean, School of Primary Medical Care

Silas Grant, A.B., M.D.
Assistant Dean, School of Primary Medical Care
J. Edward Rush, Jr., B.S., Ph.D.
Dean, School of Graduate Studies and Research

Earl C. Jacoby, A.B.
Director of Fiscal Affairs

Kenneth E. Johnson, B.S., Ph.D.
Director, Center for Environmental Studies

James D. Moebes, B.A., B.D., M.A., Ph.D.
Director, Division of Student Affairs
Assistant Dean for Academic Affairs

Jane E. Nelson, B.A.
Director, Office of News and Publications

Jean M. Perreault, B.S., M.A., M.A.
Head of the Library and Library Services

Raymond C. Watson, Jr., B.S., M.S.E., M.S.
Director, Division of Continuous Education

Nan G. Hall, B.S., M.A.S.
Registrar
Coordinator of Admissions and Records

Reva J. Bailey, B.A., M.A.S.
Assistant Registrar

Gary C. Harkey, B.S.
Director, Accounting and Financial Reporting

Leslie Ray Lasater
Coordinator, Data Processing

Gerry Moore, B.S.
Personnel Assistant

K.O. Thompson, B.S., B.A.E., B.B.A., M.S., Ph.D.
Director, Institutional and Research Support Services

Robert L. Vess, Jr.
Director, Physical Plant
Walter C. Vice, B.S.
Internal Auditor
Director, Auxiliary Services

Clyde O. Williams
Purchasing Agent

Michael C. Gray, B.S.B.A.
Veterans Affairs Advisor

Sandra J. Harmon, B.S.
Assistant Coordinator of High School
and Junior College Relations

Dennis J. Killips, B.S., M.A.
Coordinator of Union Activities,
Intramurals, and Athletics

Charles T. Maples, Jr., A.B., M.A.
Director of Housing

Charles R. Markin, B.S., M.A.
Coordinator of High School
and Junior College Relations

Leroy A. Mendenhall, B.A., M.A.
Coordinator of Counseling and Testing

Mae B. Satterfield
Coordinator of Financial Aids and Job Placement

A. L. Willis, B.S., M.A.
Head Basketball Coach
Faculty

(First date refers to original appointment to the University. Second date, if any, refers to date of appointment with reference to academic title listed.)

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. (Handerson 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, JOHN ALBERT JR., A.B. (University of Notre Dame), M.A. (Fordham University), Ph.D. (Georgetown University). Assistant Professor of History, 1972.


BOYER, D. ROYCE, B.S. (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; Acting Chairman, Department of Mechanical Engineering, 1965.


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 Business Administration; 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, 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, 1972, 1973.

CASTLE, JOHN GRANVILLE, JR., B.A. (University of Buffalo), Ph.D. (Yale University). Professor of Physics, 1969.


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.


COOK, F. LEE, B.S., M.S., Ph.D. (Georgia Institute of Technology). Associate Professor of Mathematics; Chairman, Department of Mathematics, 1967, 1972.


CROSSLAND, KATHRYN, B.S., M.S. (University of Alabama, Tuscaloosa), Ed.D. (University of Florida). Professor of Nursing; Dean, School of Nursing, 1971.

CULLINANE, THOMAS P., B.S. (Boston University), M.S.I.E. (Northeastern University), Ph.D. (Virginia Polytechnic Institute). Assistant Professor of Industrial and Systems Engineering, 1972.

DAVIS, JACK H., B.S., M.S., Ph.D. (Clemson University). Associate Professor of Physics, 1966, 1969.


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.


DOWE, MARY C., B.S.N., M.S.N. (Emory University). 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 Hydrology, 1972.

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 Earth Science, 1971.


FORTE, ALDO, D.Sc. (University of Havana, Cuba). Associate Professor of Mathematics, 1966.


GATZKE, HARRY, B.S., M.S. (Georgia Institute of Technology), Ph.D. (University of Illinois). Assistant Professor of Mathematics, 1973.


GRAHAM, JOY M., B.S. (Florence State College), M.L.S. (George Peabody College). Assistant Professor of Bibliography; Librarian for Behavioral and Economic Sciences, 1969.

GRANT, SILAS W., B.S., M.D. (University of Texas). Professor of Family Medicine, Assistant 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.


Hammill, Mildred A., B.A. (Union University), M.A. (Baylor University), M.L.S. (George Peabody College). Assistant Professor of Bibliography; Librarian for General British and American Philology and Education, 1969.

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.


HERMANN, RUDOLF, Ph.D. (Leipzig University), Dr. Phil habil. (Aachen Institute of Technology, Germany). Professor of Aerospace Science and Engineering, 1962, 1970.


HOLT, CECELIA ANN, B.A. (Florence State College), M.S. (University of Kentucky). Instructor in Mathematics, 1968.

HOOMANI, JAFAR, B.S., M.S., Ph.D. (North Carolina State University). Associate Professor of Mathematics; Dean, School of Science and Engineering, 1968, 1969.


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 in Nursing, 1973.


KHEIR, NAIM A., B.S.E.E. (Ain-Shams University, Cairo, Egypt), Ph.D. (Hungarian Academy of Sciences). Assistant Professor of Electrical Engineering, 1969.

KILGO, REESE D., B.A. (University of Alabama, Tuscaloosa), M.Ed. (University of Florida), Ph.D. (University of Texas). Associate Professor of Education & Assistant Professor of Sociology, 1966, 1972.

KIRKPATRICK, SUE W., B.Sc., M.Sc., Ph.D. (The Ohio State University). Assistant Professor of Psychology, 1972.


KUBITZA, WILLIAM K., Diplom-Ingenieur (Technical University, Darmstadt,
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.

Liu, Frank C., B.S.M.E. (National Chekiang University), M.S.M.E. (University of Washington), Ph.D. (University of Texas). Professor of Engineering, 1967.

Lloyd, Mary A., B.S.N., M.Ed. (University of Florida). Assistant Professor of Nursing, 1972.


Maurer, Alice C., B.S. (University of Alabama, Tuscaloosa), M.S. (Florida State University). Instructor in Natural Sciences, 1972.


McCalister, Donald V., A.B. (Fresno State College) Ph.D. (University of Tennessee), Visiting Professor of Sociology; Visiting Professor of Medical Sociology, 1972, 1973.


Merrill, Ruth C., B.S.N. (University of Alabama, Tuscaloosa), M.S.N., (University of Alabama, Birmingham), Assistant Professor of Nursing, 1973.


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; Director, Division of Student Affairs and Assistant Dean for Academic Affairs, 1972.


O'NEAL, ROBERT DAWSON, A.B. (Florida State University), M.A. (University of New Mexico), Ph.D. (Florida State University). Associate Professor of Spanish; Chairman, Department of Modern Foreign Languages, 1967, 1971.


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; Head of Library and Library Services, 1969.


POPE, RICHARD C., B.A., M.A. (University of Louisville). Associate Professor of Art; Chairman, Department of Art, 1966, 1970.


RETTIG, LAWRENCE, B.A., M.A., Ph.D. (University of Iowa). Assistant Professor of German, 1973.

RHEINFURTH, MARIO H., B.S., M.S. (University of Darmstadt, Germany). Adjunct Associate Professor of Aerospace 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 PAULINE, 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., M.S.N. (University of Alabama, Tuscaloosa). 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; Librarian for History and Political Sciences, 1971.


SMALLEY, LARRY L., B.S., M.S., Ph.D. (University of Nebraska). Associate Professor of Physics; Chairman, Department of Physics, 1967, 1973.

SMITH, DONALD H., B.A., M.A. (California State College at Long Beach), Ph.D. (Emory University). Assistant Professor of Sociology, 1972.
SMITH, HERBERT T., B.S. (University of Houston), M.D. (Baylor School of Medicine). Assistant Professor of Family Medicine, 1973.

STEPHENS, G. GAYLE, B.S. (Missouri University School of Medicine), M.D. (Northwestern University), Professor of Family Medicine; Dean, School of Primary Medical Care, 1973.

STETTLER, JOHN D., B.S. (Notre Dame), Ph.D. (Massachusetts Institute of Technology). Adjunct Associate Professor of Physics, 1965, 1970.


SULLINS, WALTER R., B.A. (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.

TARTER, DONALD E., B.S. (Middle Tennessee State College), Ph.D. (University of Tennessee). Associate Professor of Sociology; Chairman, Department 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.


TORDERA, 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.


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., Graduate Study (Duke University). Instructor in Political Science; Acting Chairman, Department of Political Science, 1967.


WILHELM, MICKEY, B.S.E., M.S.E., Ph.D. Candidate (The University of Alabama in Huntsville). Instructor in Industrial Engineering, 1973.


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.

WOLFE, WALTER N., B.S. (Auburn University), M.S. (DePaul University), Graduate Study (Auburn University). Instructor in Mathematics, 1968.


WU, CRAIG CHI-YEN, B.A. (National Taiwan University), M.A., Ph.D. (Vanderbilt University). Assistant Professor of Economics; Acting Chairman, Department of Economics, 1970, 1971.

WU, SHI TSAN, B.S. (National Taiwan University), M.S. (Illinois Institute of Technology), Ph.D. (University of Colorado). Professor of Engineering, 1967, 1972.


Lecturers

(Date refers to original appointment to the University.)


BAILEY, ALLISON C., B.S., B. Arch. (Georgia Institute of Technology). Lecturer in Interior Decoration, 1973.


BOWDEN, CHARLES M., B.S. (University of Richmond), M.S. (University of Virginia), Ph.D. (Clemson University). Lecturer in Physics, 1971.


BURNS, ROWLAND E., B.S. (Case Institute of Technology), M.A. (The University of Alabama in Huntsville), M.S., Ph.D. (University of Alabama, Tuscaloosa), Lecturer in Engineering, 1972.

BUYCK, ROBERT, First & Second Bacc. (University of Nancy, France), License es Lettres (University of Toulouse, France), Ph.D. (University of Colorado). Lecturer in French, 1970.


DAILEY, GRACE E., A.B. (Colby College), M.Ed. (Harvard University). Lecturer in English, 1967.


DEVRIES, LEONARD L., B.S. (University of Minnesota), M.S. (Iowa State College), Ph.D. (St. Louis University). Lecturer in Physics, 1972.


FREEMAN, LEONARD M., B.S. (Charleston College), M.A. (University of Oklahoma). Lecturer in Modern Administration, 1973.


GLAESER, JOHN ROGER, B.S., M.S., Ph.D. (University of Missouri). Lecturer in Engineering, 1972.


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.

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.


KHEIR, FERIAL, B.A. (Ain-Shams University), Ph.D. (Budapest University). Lecturer in French, 1970.


KRUSE, ROBERT B., B.S. (Butler University), M.S., Ph.D. (Purdue University). Lecturer in Modern Technology, 1973.

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.


LUQUIRE, KAREN B., B.S. (Spring Hill College), M.A.C.T. (University of Tennessee, Knoxville). Instructor in Biology.


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.

MC KNIGHT, WILLIAM B., B.S. (Purdue University), Ph.D. (Oxford University). Lecturer in Physics, 1972.


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.


SHAMSAVORI, ALI, B.A. (National University of Iran), Ph.D. (Vanderbilt University). Lecturer in Economics, 1972.


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.


WATSON, RAYMOND C., JR., B.S. (Jacksonville State College), M.S.E. (University of Alabama, Tuscaloosa), M.S. (University of Florida). Lecturer in Modern Technology; Director, Division of Continuous Education, 1961.


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