1978

1978-1979 Catalog

The University of Alabama in Huntsville

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Financial Information

NOTICE
This insert is a supplement to the 1978-79 UAH Catalog. It replaces the information on pages 14, 15, and 16.

Expenses per Term

ON CAMPUS:

Full-Time Students Taking 8 to 13 Semester Hours (Undergraduate) .................................................. $237.00
Full-Time Students Taking More Than 13 Semester Hours (Undergraduate) ............................................ $237.00
  plus $26.00 per semester hour for each hour in excess of 13
Full-Time Students Taking 5 to 10 Semester Hours (Graduate) ............................................................. $251.00
  plus $41.00 per semester hour for each hour in excess of 10
Full-Time Students Taking More Than 10 Semester Hours (Graduate) .................................................... $251.00

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

Part-Time Students Taking 7 or Less Semester Hours (Undergraduate)
  Registration
    Registration Fee .................................................. $ 3.00
  Course, Buildings, and Student Union Fees per Semester Hour .................................................. $ 32.00
  Student Activity Fee ...................................................... $ 6.00
  Registration Fee for Courses on Semester Basis ................................................................. $ 4.50
Part-Time Students Taking 4 or Less Semester Hours (Graduate)
  Registration Fee .................................................. $ 3.00
  Course, Buildings, and Student Union Fees per Semester Hour .................................................. $ 50.00
  Student Activity Fee ...................................................... $ 6.00

An estimated average cost of books per term for full-time students is $67.00.

OFF CAMPUS:

Undergraduate
  Registration Fee .................................................. $ 3.00
  Course fees per Semester Hour or equivalent C.E.U. .................................................. $ 25.00
Graduate
  Registration Fee .................................................. $ 4.00
  Course fees per Semester Hour or equivalent C.E.U. .................................................. $ 32.00

*A student Union Fee of $2.00 is included in the cost of each of the first four hours only for each person enrolled each term.
Payment of Fees

A Fee Statement showing total amount due will be mailed to each student each term. Payment should be made by check if possible and mailed to the Cashier's Office along with the Fee Statement. If a student does not receive a Fee Statement prior to the announced fee due date he must 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.

The university has adopted a single payment system for fees effective with Fall term 1978-79. Under this system a statement will be mailed to each student shortly after classes begin. Due date for payment will be indicated on the statement. Accounts not paid in full on or before due date will be charged a $10.00 late payment fee and will be considered delinquent. Students whose accounts are delinquent will be subject to withdrawal for non-payment.

Students who are withdrawn for non-payment will not be allowed to attend classes. They will have seven (7) class days to become reinstated. Reinstatement is accomplished by paying at the Cashier's Office all past due indebtedness to the university (including late fees) and presenting notice of payment to the Office of Admissions and Records.

Those students who do not reinstate will still be responsible for payment of all charges due. Registration requests will not be processed for students who owe delinquent fees.

Many students have all or part of their tuition and other costs paid by various sponsoring agencies (including tuition remission for faculty/staff and their dependents). It is the student's responsibility to see that the Cashier's Office receives the approved tuition assistance authorization from his sponsor. In many cases the sponsor does not pay the entire statement. These students should contact the Cashier's Office to determine the unpaid amount because the late payment fee will be assessed on any balance unpaid by the due date.

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

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

Other Charges

Drop of Course Fee ......................................................... $ 5.00
Addition of Course Fee ................................................... $ 5.00
Change of Course Fee ..................................................... $ 5.00

No course changes, drops, adds (except withdrawal) will be permitted after Late Registration unless approved by the Dean of the appropriate school.

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.

Withdrawal fee .............................................................. $15.00
(after Late Registration and before end of second week of classes)

Laboratory and Studio Instruction Fees

Level 1 ................................................................. $ 3.00
Level 2 ................................................................. $10.00
Level 3 ................................................................. $15.00
Level 4 ................................................................. $20.00
Level 5 ................................................................. $30.00
Late Payment Fee $10.00
Late Registration Fee (in addition to regular registration fee) $10.00
Returned Check Handling Fee
1st Check $1.00
2nd Check $2.00
3rd Check $5.00
Replacement of I.D. Card $2.00
Transcript Fee first transcript free-each additional copy $2.00

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

Cap and Gown Rental or Purchase-Handled through the Book Nook
Graduation Fees $15.00
If qualifications for graduation are not met and if diploma has been ordered, $10.00 will be refunded.

Duplicate Diploma $7.50
Thesis Binding Fee (3 copies) $13.00
Each Additional Copy (Thesis) $4.25
Vehicle Registration Fee $5.00

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 Registration fee $3.00
Withdrawal before end of second week of classes Withdrawal fee $15.00
Withdrawal after second week of classes 100% of basic fees

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

School of Primary Medical Care

General Fee (per academic quarter*) $400.00
Out-of-State Residents (per academic quarter*) $800.00
UAH Student Health Service Fee (per academic quarter) $11.50 Hospitalization Insurance (per year) Variable
Personal Liability Insurance (per year) $25.00
Student Activity Fee (per academic quarter) $12.00
Building Fee (per academic quarter) $30.00
Vehicle Registration Fee (per calendar year) $5.00

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

Financial Aid

See section on "Student Affairs."
The catalog of The University of Alabama in Huntsville, Huntsville, Alabama 35807 is published twice monthly. Entered as second class matter at the Post Office in Huntsville, Alabama.
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- **STAFF HOLIDAYS:** Sept 4, Nov 23, Dec 21-23, Jan 1; Apr 13, May 28, July 4.


Academic Calendar

Fall Term, 1978

Early Registration ............................................ July 13-July 26
Orientation ....................................................... July 12 & August 17
Application Deadline ............................................ August 15
Regular Registration ............................................ September 5
Classes Begin ....................................................... September 7
Late Registration .................................................. September 7 & 8
Examinations ...................................................... November 17, 18, 20, & 21

Winter Term, 1978-79

Early Registration ................................................ October 12-25
Orientation ......................................................... November 16
Application Deadline ............................................. November 10
Regular Registration ............................................. December 1
Classes Begin ......................................................... December 4
Late Registration .................................................. December 4 & 5
Examinations ....................................................... February 23, 26, 27, & 28

Spring Term, 1979

Early Registration ................................................ January 18-31
Orientation ......................................................... February 22
Application Deadline ............................................. February 14
Regular Registration ............................................. March 7
Classes Begin ......................................................... March 9
Late Registration .................................................. March 9 & 12
Examinations ....................................................... May 21, 22, 23, & 24

Summer Term, 1979

Early Registration ................................................ April 19-May 2
Orientation ......................................................... May 17
Application Deadline ............................................... May 14
Regular Registration ............................................. June 4
Classes Begin ......................................................... June 6
Late Registration .................................................. June 6 & 7
Examinations ....................................................... August 17, 18, 20, & 21
Class Periods

Monday, Wednesday, Friday

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<td>H</td>
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<td>R</td>
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<td>S</td>
<td>6:00 pm- 8:00 pm (MW only)</td>
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The UAH Term System

UAH operates on a system in which four identical terms, each spanning 12 weeks, constitute a calendar year. Credit for course work is granted in standard semester hour units.
The University of Alabama in Huntsville is dedicated to the intellectual, aesthetic, social, and economic advancement of the state and region it serves, and to the proposition that it can best aid in this advancement by being a competent member of the national and international academic communities.

Such membership requires constant attention to teaching, research, and interaction with the local, state, and regional communities. It demands a steady allegiance to the academic values: an atmosphere conducive to the unhindered pursuit of knowledge and the education of students primarily as thinking individuals. Basic to the establishment and maintenance of its identity as a true university is a strong program in the liberal arts and sciences, which continues to form the core of education. Progressively, this institution intends to expand its programs by pursuing the special advantages of its environment.

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

In the development of its programs, the University intends to seize all of these advantages by incorporating new academic disciplines, enriching traditional studies, and creating fresh academic approaches as the faculty and students concentrate on the vastly complex problems of contemporary life.
The University of Alabama in Huntsville (UAH) is a part of the University of Alabama System. In June of 1969, the Board of Trustees established the University of Alabama System with three independent, autonomous campuses—Huntsville, Birmingham, and Tuscaloosa. Each campus has a separate president who reports to the Board of Trustees through the Chancellor of the System. Academic programs were initiated in Huntsville in 1950; in 1963 degree opportunities at the master's level were provided; in 1964 degree programs at the baccalaureate level were initiated. The first master's degree based on work begun and completed in Huntsville was awarded in 1964; the first undergraduate degrees were awarded in 1968. Doctoral programs in physics and engineering were initiated in 1971. In 1973, UAH received its first resident in family practice and its first medical students taking electives toward their M.D. degree from the University of Alabama School of Medicine. UAH's first full-time medical students began their core clinical experience at the Huntsville component of The University of Alabama School of Medicine in the fall of 1974. UAH is accredited by the Southern Association of Colleges and Schools.

This brief chronology indicates that the programs of UAH are still in the developing stages, a characteristic of viable programs in any university. UAH was brought into being and is growing to meet the specific needs of scientific and technological enterprises and the cultural and intellectual needs of a rapidly expanding region.

Since the UAH program is new, it is relatively unfettered by tradition and patterns of established practice. It is our intention to be innovative, even experimental, to explore what is new, to evaluate existing programs continually, to develop and establish curricula and pedagogical techniques calculated to help students live and perform better in a complicated environment.

UAH is supported by the state, federal, and local governments, and by generous individuals and industries. The existing programs strive for superiority within limited areas and though expansion is anticipated, a wide variety of specialties is not planned for the foreseeable future.

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

The School of Humanities and Behavioral Sciences offers the Bachelor of Arts degree with majors in art, criminal justice, economics, English, French, German, history, music, music education, political science, psychology, Slavic studies, and sociology. The Bachelor of Science in Business, Administration degree is offered with majors in
accounting, finance, management, and marketing. The Master of Administrative Science degree and a Master of Arts degree in developmental learning are offered; a Master of Arts degree in English was added in 1974-75 and a Master of Arts degree in History in 1976-77. 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, mathematics, mathematics education, and physics. In addition, courses are offered in computer sciences, environmental sciences, natural sciences, and statistics.

The undergraduate program in engineering is founded on a unified and broad core curriculum with options of specialization in electrical 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, Master of Science degree in physics, and Master of Science degree in Computer Science. The Master of Science degree in Biological Sciences can be obtained through a joint degree program with Alabama A&M University.

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 and in mathematics can be obtained through a cooperative program with The University of Alabama, Tuscaloosa, with one year residency at the Tuscaloosa campus.

The School of Nursing offers the Bachelor of Science in Nursing degree. The program is a flexible one aiming toward the development of persons who can assume responsible citizenship while practicing nursing. The program is fully approved by the Alabama Board of Nursing and accredited by the National League for Nursing. The School of Nursing also offers a Master of Science in Nursing degree. The focus of the graduate program is family nursing practice with functional options in teaching, administration and clinical practice.

The School of Primary Medical Care is a community-based clinical school of medicine with a residency program in family practice and clerkships and electives for students in the University of Alabama System Medical Education Program, which includes the medical components at Birmingham, Tuscaloosa, and Huntsville. Students in the tricampus Medical Education Program take their Correlated Basic Medical Science training in Birmingham; all three companies offer components of the core clinical Experience and the Individualized Experience.

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 UAH Library is being developed to give maximum support to the academic and research programs. Its more than 180,000 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.
Facilities

The 337-acre campus of The University of Alabama in Huntsville is located in Northwest Huntsville adjacent to Research Park. The eleven campus University buildings, all of which have been constructed since 1960, contain modern equipment and exemplify modern functional design. Additionally, the ten-acre medical campus of the University is located in the downtown Medical District of Huntsville and provides two modern buildings for medical education and patient health care.

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

The Science Building contains classrooms and laboratories for programs in biological, environmental, and physical sciences. 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 new Environmental and Life Sciences Wing of the Science Building houses the Center for Environmental and Energy Studies and the environmentally related parts of the Biology, Chemistry, and Physics departments.

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 200,000 volumes. The library has open-access stacks and student typing equipment. Services of subject specialists are available for the students and faculty.

Madison Hall (formerly the Graduate Studies Building) contains executive administrative offices, graduate classrooms, the Office of Graduate Studies, 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 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 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 new four-level School of Nursing Building is a contemporary triangular design of 46,000 square feet of space designed especially for nursing educational requirements. The
building houses administrative and faculty offices, open-ended classrooms, educational forums, service areas, and multi-purpose common areas. A modern large Learning Resources Center occupies the entire top floor.

The University Health Center, the central campus building for the School of Primary Medical Care, houses offices and medical facilities. The Ambulatory Care Center in the Huntsville Medical District downtown is the main educational facility for the School of Primary Medical Care. The building houses the headquarters for the resident, student, and continuing education programs; resources and support for medical education programs; and patient care services, including the UAH Family Practice Center. The Clinical Science Center includes the School of Primary Medical Care library, the office of educational resources, and the medical student affairs office. The Clinical Science Center is the second School of Primary Medical Care building in the Huntsville Medical District and also contains administrative offices, classrooms, and some clinical research laboratories.

The Marion Beirne Spragins Hall has classrooms and office space for Health and Physical Education and Athletic Department faculty and staff, a 2800-seat gymnasium, swimming pool, handball courts, and other physical education and recreational facilities.

**Instructional Media Services**

A comprehensive program of audio-visual services complements instruction at The University of Alabama in Huntsville. The faculty may select from a variety of instructional aids to enrich their teaching efforts. The instructional media service loans and operates a wide variety of equipment, produces video tape presentations, prepares slides and transparencies, and directs faculty members to rental sources of recordings, slides, tapes, etc., from the leading universities of the nation.

**University Housing**

The University owns 88 two- and three-bedroom apartment units within walking distance of the campus. These apartments are available to students, faculty, and staff. An additional 24 units are leased by the University to accommodate the housing demand.

**The University Noojin House**

Built in 1950 as the gracious private residence of F. Kenneth Noojin, the house became available to the community through acquisition by The University of Alabama Huntsville Foundation. The house is available for receptions, conferences, luncheons, parties, and workshops. The University of Alabama in Huntsville faculty, staff, students and the Huntsville community are encouraged to utilize this beautiful facility.
Admissions Information

The University of Alabama in Huntsville welcomes inquiries and applications from interested persons who wish to further their education. The UAH student body is composed of individuals of all ages—traditional full-time college students and other adults who are combining their educational pursuits with work, family, and other activities. Application for admission should be made well in advance of the date of proposed entrance but not more than one calendar year. See UAH calendar for application deadline dates for specific terms.

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

Application forms, detailed instruction as to how to apply, catalogs, and information brochures are available at the office of Admission and Records 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 department concerned. 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 for Freshmen

Applicant must submit:
1. Completed application forms.
2. Nonrefundable application fee of $15.00.
3. A Student Medical Form.

In addition, he must request that:
1. Two copies of his high school transcript be sent from the high school to the Office of Admissions and Records and
2. (Plan A) ACT test scores be sent from ACT to the Office of Admissions and Records.
   (Plan B) Official score reports of GED examinations be sent from agency administering tests to the Office of Admissions and Records (if the applicant does not have a high school diploma).

The application for admission must be in the Office of Admissions and Records by the date specified in the UAH calendar.

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 or better.

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 years of high school or concurrent with their senior year in high school. For detailed information, such students should see their high school counselors or personnel in the Office of Admissions and Records 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. A student who is currently on suspension from any other college or university is not eligible for enrollment until such suspension period has terminated.

Students Transferring within the University of Alabama System

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

Students Transferring from Other Institutions

A prospective transfer student who has attempted fewer than 18 semester hours of work at an accredited college or university and who has at least a 0.5 average (on a 3.0 system) or who has passed at least half of the work attempted will be considered for admission on the basis of high school grades and ACT scores.

Applicants with previous records showing 18 semester hours or more of work attempted at accredited colleges or universities must have a minimum overall C average on all work attempted in order to qualify for unconditional admission.

An applicant with less than an overall C average on 18 semester hours or more of work may be admitted as a regular student on probation upon recommendation of the dean of the school in which he plans to major, provided:
1. The quality point average is at least 0.75 (1.0=C); and
2. The quality point deficiency is less than 8.

Evaluation of Transfer Credit

For all transfer students who indicate an intention to earn a degree at UAH, transfer credits are evaluated by personnel in the Office of Admissions and Records prior to or during the first term of enrollment. The application of such accepted credits to a particular program of study will be made and approved at the time of official determination of the individual's program of study. It must be understood that acceptance and application of credits are two separate and distinct processes.

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

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

A maximum of 64 semester hours of credit from a junior college may be applied toward a degree. If a student transfers from a junior college and has previous credits from a senior college, his credits will be evaluated on an individual basis and may be limited to a maximum of 64 hours to be applied toward a degree. Exceptions to the 64-hour maximum must be justified and approved in writing by the dean of the school in which the student is enrolled.

If the previous record was earned at an institution not holding regional accreditation, a
decision on acceptance of credits will be made on an individual basis. If credits are accepted, they will be classified as “provisional.” Full credit for 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.

Application Procedure for Transfers

Applicant must submit:
1. Completed application forms.
2. Nonrefundable application fee of $15.00.
3. A Student Medical Form.

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

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

An individual who has applied and who does not qualify as a regular transfer student may be admitted on probation as a special student. 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.

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 graduate.

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.)

An individual holding a bachelor's degree, or higher, may apply to attend UAH as a special student. He, also, will be limited to an accumulated total of 15 semester hours and will be expected to qualify for admission as an irregular post graduate student or as a graduate student if he plans to continue his studies at UAH. See Graduate School IPG section for additional information.

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 Application Forms 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. No permanent record is established for students admitted in this category. (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.)

For information on the Listener's License Program, see section on Continuous Education.

Admission of Foreign Students

Foreign students are expected to meet all established requirements for admission from secondary school or from other colleges and universities. ALL FOREIGN APPLICANTS MUST APPLY FOR ADMISSION AT LEAST THREE (3) MONTHS IN ADVANCE OF DESIRED ATTENDANCE DATE.

Admission Requirements

Undergraduate applicant must submit in addition to a completed application and application fee:

Transcripts — Two (2) official copies, in English, of secondary school and college/university transcripts forwarded to The University of Alabama in Huntsville directly from the institution(s) attended. (DO NOT SEND PERSONAL COPIES.)

ACT Scores — American College Test (ACT) scores sent directly to UAH from ACT Headquarters. (ACT is not required of applicant who has earned more than 18 semester hours of college work or was graduated from high school more than 5 years ago.)

TOEFL Scores — All foreign applicants must submit scores from the Test of English as a Foreign Language (TOEFL). Scores must be sent directly to UAH from Educational Testing Service.

Financial Statement — All foreign applicants are required to present evidence of sufficient finances to cover their university and personal expenses while attending The University of Alabama in Huntsville. A certified financial statement must be completed and submitted. In addition, a deposit of $1500 is required before an applicant will be considered for admission. The procedure for making this deposit is as follows:

Have a bank cashier's check drawn in U.S. Dollars in the amount of $1500.00 made payable to The University of Alabama in Huntsville. Mail this check to the Office of Admissions, The University of Alabama in Huntsville, P. O. Box 1247, Huntsville, AL 35807. (In the event an applicant is unable to attend UAH after making the deposit or if admission is denied, the deposit will be returned.)

The deposit must be maintained at a minimum of $750 until the student completes his studies at The University of Alabama in Huntsville. He may withdraw $250 per term until his balance is reduced to $750. The amount held on deposit by the University will accrue interest.

Health and Accident Insurance — All foreign applicants must present evidence of a
University approved health and accident insurance coverage. Proof of continued coverage must be presented by student each term enrolled.

Individuals in the U.S. on a student visa who are students transferring from another college or university in the U.S. must show evidence of release from the previous program by the foreign student advisor at their previous school. Transfer students must have completed the equivalent of one (1) academic term at those institutions before admission will be granted at UAH.

Graduate applicant must submit in addition to a completed application and application fee:

Transcripts — Two (2) official copies, in English, of each college and/or university transcript forwarded to The University of Alabama in Huntsville directly from the institution(s) attended. (DO NOT SEND PERSONAL COPIES.)

GRE Scores — Graduate Record Examination (GRE) scores sent directly to UAH from Educational Testing Service.

TOEFL Score — All foreign applicants must submit scores from the Test of English as a Foreign Language (TOEFL). Scores must be sent directly to UAH from Educational Testing Service.

Financial Statement — All foreign applicants are required to present evidence of sufficient finances to cover their university and personal expenses while attending The University of Alabama in Huntsville. A certified financial statement must be completed and submitted. In addition, a deposit of $1500 is required before an applicant will be considered for admission. The procedure for making this deposit is as follows:

Have a bank cashier’s check drawn in U.S. dollars in the amount of $1500.00 made payable to The University of Alabama in Huntsville. Mail this check to the Office of Admissions, The University of Alabama in Huntsville, P.O. Box 1247, Huntsville, AL 35807. (In the event an applicant is unable to attend UAH after making the deposit or if admission is denied, the deposit will be returned.)

The deposit must be maintained at a minimum of $750 until the student completes his studies at The University of Alabama in Huntsville. He may withdraw $250 per term until his balance is reduced to $750. The amount held on deposit by the University will accrue interest.

Health and Accident Insurance — All foreign applicants must present evidence of a University approved health and accident insurance coverage. Proof of continued coverage must be presented by student each term enrolled.

Readmission

A student who has not attended UAH for one or more terms and who wishes to return should consult with the Office of Admissions and Records 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.

Admission to Student and Resident Medical Programs

Information concerning admission to the University of Alabama School of Medicine and to the UAH-Huntsville Hospital Family Practice Residency Program will be found in the section on the School of Primary Medical Care.
Non-Matriculated Students

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

A non-matriculated student may complete application procedures at the time of registration. No transcripts or other credentials are required. A non-matriculated student must certify that he or she is:

1. a high school graduate or has a satisfactory score (50 or higher) on the GED,  
2. has the stated prerequisites for the course desired, and  
3. is not under current suspension from another collegiate institution.
Financial Information

Expenses per Term

ON CAMPUS:

Full-Time Students Taking 8 to 13 Semester Hours
(Undergraduate) .................................................. $215.00

Full-Time Students Taking More Than 13 Semester Hours
(Undergraduate) .................................................. $215.00

plus $23.00 per semester hour for each hour in excess of 13

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

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

Part-Time Students Taking 7 or Less Semester Hours (Undergraduate)
Registration Fee .................................................. $ 3.00
Course, Buildings, and Student Union Fees per Semester Hour.......... *$ 28.00
Student Activity Fee ........................................... $ 4.00
Registration Fee for Courses on Semester Basis ........................... $ 4.50

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

An estimated average cost of books per term for full-time students is $67.00.

OFF CAMPUS:

Undergraduate:
Registration Fee .................................................. $ 3.00
Course fees per Semester Hour or equivalent C.E.U. ....................... $ 22.00

Graduate
Registration Fee .................................................. $ 4.00
Course fees per Semester Hour or equivalent C.E.U. ....................... $ 32.00
*A Student Union Fee of $1.75 is included in the cost of the first hour only for each person enrolled each term.

**Payment of Fees**

A Fee Statement showing total amount due will be mailed to each student each term. Payment should be made by check if possible and mailed to the Cashier's Office along with the Fee Statement. If a student does not receive a Fee Statement prior to the announced fee due date he/she must contact the Cashier's Office. It is the student's responsibility to see that his/her account is paid by the final date for payment indicated on the statement.

The University is moving to a single payment system for fees. This payment will be due at the beginning of the term. Details concerning this system are being finalized and will be announced prior to the implementation of the system.

Many students have all or part of their tuition and other costs paid by various sponsoring agencies (including tuition remission for faculty/staff and their dependents). It is the student's responsibility to see that the Cashier's Office receives the approved tuition assistance authorization from his/her sponsor. In most cases the sponsor does not pay the entire statement. These students should contact the Cashier's Office to determine the unpaid amount because the late payment fee will be assessed on any balance unpaid by the due date.

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

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

**Other Charges**

Addition of Course Fee ........................................ $ 5.00
Change of Course Fee ........................................ $ 5.00
Examination Fee (Deferred or Special) ......................... $ 2.00

A student missing more than two examinations in one term is charged a maximum fee of $5.00.

Laboratory and Studio Instruction Fees:
  Level 1 .................................................. $ 3.00
  Level 2 .................................................. 10.00
  Level 3 .................................................. 15.00
  Level 4 .................................................. 20.00
  Level 5 .................................................. 30.00
Late Payment Fee ........................................... 10.00
Late Registration Fee (in addition to regular registration fee) .......................... 10.00
Returned Check Handling Fee
  1st Check .................................................. $ 1.00
  2nd Check .................................................. 2.00
  3rd Check .................................................. 5.00
Replacement of I.D. Card ................................... 2.00
Transcript Fee—first transcript free—each additional copy ....................... 2.00

No transcript will be issued for a person who has a financial obligation to the University.
Cap and Gown Rental or Purchase—Handled through the Book Nook
Graduation Fees .................................................. 15.00

If qualifications for graduation are not met and if diploma has been ordered, $10.00 will be refunded.

Duplicate Diploma .................................................. 7.50
Thesis Binding Fee (3 copies) .................................. 13.00
Each Additional Copy (Thesis) .................................. 4.25
Vehicle Registration Fee ........................................... 5.00

Regulations concerning traffic and parking will be distributed at registration.

Withdrawals and Refunds

After a student has registered, he/she will be carried on the class rolls until such time as written notification is received that he/she 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.

<table>
<thead>
<tr>
<th>Withdrawal Period</th>
<th>Charges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Withdrawal after registration is completed but before first class meeting of the course</td>
<td>Registration fee 25% of basic fees</td>
</tr>
<tr>
<td>Withdrawal during first week of classes</td>
<td>Registration fee 50% of basic fees</td>
</tr>
<tr>
<td>Withdrawal during second week of classes</td>
<td>Registration fee 75% of basic fees</td>
</tr>
<tr>
<td>Withdrawal during third week of classes</td>
<td>Registration fee 100% of basic fees</td>
</tr>
</tbody>
</table>

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

School of Primary Medical Care

General Fee (per academic quarter*) .................................. $400.00
Out-of-State Residents (per academic quarter*) ...................... 800.00
UAH Student Health Service Fee (per academic quarter) ............... 11.50
Hospitalization Insurance (per year) .................................. Variable
Personal Liability Insurance (per year) .................................. 25.00
Student Activity Fee (per academic quarter) .......................... 8.00
Building Fee (per academic quarter) ................................... 8.00
Vehicle Registration Fee (per calendar year) .......................... 5.00

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

Financial Aid

See section on “Student Affairs.”
University Housing

Monthly rental rates for Community housing are as follows:

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<th>Furn.</th>
<th>Unfurn.</th>
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<tbody>
<tr>
<td>Two Bedroom Apartment</td>
<td>$188</td>
<td>$169</td>
</tr>
<tr>
<td>Private Apartment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Students per Apartment</td>
<td>$94</td>
<td></td>
</tr>
<tr>
<td>(private room)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Three Bedroom Apartment</td>
<td>$204</td>
<td>$186</td>
</tr>
<tr>
<td>Private Apartment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Students per Apartment</td>
<td>$68</td>
<td></td>
</tr>
<tr>
<td>(private room)</td>
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</tbody>
</table>

Pre-School Learning Center

Attendance Plan                                      Fees
Plan A—All day (full week)                           $22.50 per week
Plan B—Half day (full week)                          $15.00 per week
Plan C—All day (M-W-F)                               $18.00 per week
Plan D—Half day (M-W-F)                              $9.00 per week
Plan E—All day (T-Th)                                $12.00 per week
Plan F—Half day (T-Th)                               $6.00 per week
Plan G—Afternoon by the Hour                         75¢ per hour (two-hour minimum)
Student Affairs

The Division of Student Affairs provides services to individual students which facilitate the student's attainment of academic, cultural, social and personal goals. Additionally, the Division of Student Affairs coordinates and supports group activities and campus events which enhance the quality of student life at the University. These student needs and interests are served by the Offices of Counseling and Testing, Educational Opportunity Center, Financial Aids and Job Placement, Veteran Affairs, Housing, Pre-School Learning Center, High School and Junior College Relations, the University Union, and Athletics. The Division of Student Affairs also supports Student Government Association activities and programs. Interpreting and administering the Student Judicial Code, which protects student rights and assists students in their awareness of student responsibilities, are additional functions of the Division of Student Affairs.

Services

Office of Counseling and Testing

Counseling Services

This Office offers assistance in numerous areas to all UAH students. Its staff works with persons experiencing indecision related to career or curriculum, with students having academic/problems, with individuals having personal problems, and with students who feel an occasional need for someone with whom they can talk. All discussions in a counseling relationship are held in strict confidence.

Testing Services

The tests administered by the Office of Counseling and Testing serve four major functions: individual counseling, admissions, placement, and credit by examination. Tests designed for use in individual counseling or in career-related decisions are administered at no charge and provide the student with information about individual interests, aptitudes, abilities, and personality characteristics. The tests used for admissions, credit by examination, and placement administered through this office are: the American College Testing (ACT) Program, the Miller Analogies Test (MAT), the Graduate Record Examination (GRE), the Medical College Admissions Test (MCAT),
the National Teacher Examinations (NTE), the College Level Examination Program (CLEP), the General Educational Development (GED) Testing Program, the National Engineering Aptitude Search (NEAS), and the foreign language and chemistry placement tests.

Tutoring Services

Tutoring services are coordinated through the Office of Counseling and Testing in conjunction with the UAH satellite unit of the North Alabama Educational Opportunity Center and the Veterans Educational Assistance Program. All students at UAH are eligible for the EOC tutorial program which is provided at no cost. Students who are eligible for the Veterans Educational Assistance Program may be reimbursed for tutoring arranged through the Office of Counseling and Testing. Additional tutoring is available through the SGA subsidy program which pays one half of any tutoring costs. Students wishing to work as tutors are invited to seek approval by the chairman of the department which he will assist. These tutors will also be used to meet the needs of elementary and high school students seeking tutoring. In addition, short courses in study skills and reading improvement are offered.

Reference Literature

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

UAH students and other members of the Huntsville community are encouraged to use the services of this Office. Come in or call the Office of Counseling and Testing, Room 220, Morton Hall, 895-6445.

Office of Financial Aids & Job Placement

Student Aid

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

Comprehensive, up-dated information on all financial aid offered through the Office of Financial Aid is available in a booklet published annually by the Division of Student Affairs. Detailed information is included regarding kinds of aid, eligibility guidelines, application procedures, criteria for award, disbursement methods and regulations and Institutional policy followed in administration of aid. These booklets and necessary forms are available in the Office of Financial Aid and Job Placement.

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.

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 a copy of the
financial aid booklet 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 Need Assessment

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 $1000.00. Scholarship applications are available in the Office of Financial Aid. The deadline for receipt of applications is April 1.

The following scholarships are awarded annually:

Kelly Zettle Memorial Scholarship—This scholarship was established in memory of Jacqueline Kelly Zettle from donations to the University. It is awarded each year to a student or students pursuing a music major. To be eligible, one must be a full-time student having a grade point average of at least 1.0.

Gerhard B. Heller Memorial Scholarship—This scholarship was established in memory of the late Mr. Gerhard B. Heller from donations to the University from family and friends. It is awarded annually for one year beginning with the Fall Term to a full-time junior or senior student majoring in physics or chemistry. The recipient must have an overall 2.0 quality point average and not less than a 2.5 average in physics (if a physics major) or in chemistry (if the student is a chemistry major). The scholarship shall be in the amount of the earned interest or dividends on hand as of the time of the granting of the scholarship, however, it is not to exceed $1,000.

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

Carl T. Jones Engineering Scholarships—This scholarship was established from donations to UAH and The University of Alabama Huntsville Foundation in the memory of the late Carl T. Jones, prominent Huntsville businessman and civic leader. It is awarded annually to two full-time freshman students majoring in engineering and indicating a desire to practice this profession in Alabama.

JoAnn Sloan Memorial Scholarship—This scholarship was established in memory of
JoAnn Elizabeth Sloan from donations to the University from family and friends. It is awarded annually to a full-time student or students pursuing a major in Nursing. The recipient must be in good scholastic standing, with demonstrated evidence of need for financial assistance.

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.

The Felix L. Newman Scholarship Fund—This scholarship was established by a gift from Mr. Felix L. Newman, a long-time resident of Huntsville and devoted friend of the University. It is awarded each year to a student at the junior level or above pursuing a degree in the humanities. To be eligible, one must be a full-time student having a grade point average of not less than 1.0. The scholarship shall be in the amount of the earned interest or dividend on the principal at the time of the granting for one or more scholarships. However, no scholarship shall exceed $1,000 for any academic year.

Wernher von Braun Scholarship—This scholarship, created in honor of Dr. von Braun by his numerous friends, is awarded annually to a full-time junior or senior student. The recipient is selected on the basis of his quality point average, which must be 2.5 or better, his contribution to UAH and the community, and his potential for leadership.

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

Huntsville Community Chorus Scholarship—A scholarship in the amount of $375 is awarded each year by the Huntsville Community Chorus Association. To be eligible, the student must be a full-time music student in voice, maintain a 1.8 quality point average on a 4.0 scale, be a regular participant in the Huntsville Community Chorus during the period of the award, and audition before a committee of the UAH music faculty and representatives of the Chorus.

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

University Departmental Tuition Scholarships—These scholarships are awarded by individual academic departments to students demonstrating outstanding scholarship. Each scholarship covers the basic tuition, excluding special fees and laboratory fees, for the period of three consecutive terms. To be eligible the recipient must: be a full-time undergraduate student who has completed a total of at least 59 credit hours but no more than 91 credit hours by the end of the term in which he/she is considered a candidate; have an overall quality point average of 2.0; be pursuing a major in the area for which the scholarship is granted; have on file an approved AOC form; be in good financial standing with the University.

University Alumni Scholarship—The Alumni Association provides at least two $300 scholarships each year to full-time undergraduate students. The recipients are selected on the basis of need, leadership ability, and academic achievement.
Alabama Society of Professional Engineers—A scholarship is awarded each year by the Huntsville chapter of the Alabama Society of Professional Engineers to a full-time freshman engineering student who has a minimum 2.0 grade point average. This fund provides a $200 grant that is awarded during the fall term following the award.

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

Gorgas Scholarship—UAH is a corporate institute for Gorgas Scholarship Award winners and offers a limited number of tuition scholarships to the ten finalists in the Gorgas Scholarship Foundation competition. These scholarships are renewable each year for four years if the student maintains a 2.0 or better average.

Chesebrough-Ponds Scholarship—This is an annual scholarship fund in the amount of $4000 provided by the Chesebrough-Ponds Corporation for the purpose of assisting as many deserving students who, according to the judgment of the Scholarship Committee, have demonstrated sufficient need to qualify for consideration for assistance and also meet appropriate criteria with emphasis on scholastic achievement and leadership.

Omicron Delta Epsilon Scholarship—This scholarship is awarded annually to a student majoring in economics. The recipient must have and maintain an overall average of 2.0. To be eligible the student must have completed 12 hours in economics.

George W. Ditto Scholarship—This is an endowed scholarship established in memory of Mr. George W. Ditto, a man who devoted his life to the teaching profession. Two full-tuition, one-year non-renewable scholarships are offered annually to the two Senior Division Grand Winners of the Annual North Alabama Regional Science and Engineering Fair.

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

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

University Merit Scholarships—Several full-tuition scholarships are awarded to students of sophomore through graduate status who demonstrate exceptional scholastic ability. Application is through the Office of Financial Aid. The scholarships are renewable based on the accumulative grade point average at the end of Spring term.

Huntsville Board of Realtors—The Huntsville Board of Realtors awards $1200 annually to UAH students with demonstrated need for assistance and scholastic achievement who must pursue their educational objectives on a part-time basis due to the financial necessity of working full-time.

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 scholarship for three years after the first year is subject to annual review and contingent upon the student's progress and aptitude. A scholarship student must agree to practice professional nursing in 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 is unable to practice nursing in Alabama after graduation as intended, the obligation may be satisfied by repaying the amount of the scholarship received to The University of Alabama in Huntsville Nursing Scholarship Fund.

Loans

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

*National Direct Student Loan Program*—These loans are available to all students who are enrolled at least half-time and who have financial need as indicated by the Family Financial Statement. An undergraduate may be eligible to borrow a maximum of $5,000 over a period of several years. Graduate or professional students may be eligible to borrow a maximum of $10,000, including their undergraduate loans. The program contains a provision that part of the loan plus interest may be cancelled if the borrower performs military service in hostile areas. Forgiveness is also provided for teachers of handicapped and disadvantaged students and for those teaching in other special programs designated by the U.S. Office of Education.

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

A maximum of $2,500 per academic year may be applied for in most states if the educational costs warrant borrowing this much money. Total loans outstanding may not exceed $7,500 for undergraduate or vocational students. This aggregate maximum may be extended to $10,000 for students who borrow for graduate study.

Any student whose adjusted family income is less than $25,000 will automatically qualify for federal interest benefits on loans totaling up to $2,000 in any academic year. However, the maximum loan may never exceed the cost of education less other financial aid received. Students with adjusted family incomes of less than $25,000 who wish to apply for subsidized loans in excess of $2,000, or students having adjusted family incomes of $25,000 or greater and applying for a subsidized loan of any amount must submit to the lender the school's recommendation for a subsidized loan based upon the school's assessment of the family's ability to pay for the cost of education.

**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 permanent residents of the United States.

The maximum Nursing Student Loan available to an individual borrower in an academic year is $2,500 or the amount of the student's need, whichever is the 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.

**Loans and Scholarships for Medical Students**

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

**Emergency Loans**

*Emergency Student Loan Fund*—Any full-time student of The University of Alabama in Huntsville 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 student of The University of Alabama in Huntsville 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 Grant*—Provides aid to undergraduate students of exceptional financial need who would not, except for the grant, be financially able to attend college. A student must be accepted for enrollment, show evidence of academic promise, and be capable of maintaining good standing in his course of study. Grants may be renewed for the four years of undergraduate work, subject to the availability of funds and unless a major change in the family's financial condition causes the student to be ineligible. Grants are awarded in compliance with eligibility based on Federal guidelines.

*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.

In order to be eligible a student must meet the following criteria: (1) establish financial need by means of the BEOG application; (2) be enrolled in an eligible program at an eligible college, university, vocational or technical school; (3) be a U.S. citizen or in the United States for other than a temporary purpose and intend becoming a permanent resident or be a permanent resident of the Trust Territories of the Pacific Islands.

The BEOG application is submitted to a processing agency which calculates the student's "eligibility index." This index is financial need determined by a formula (applied consistently to all applicants) developed by the Office of Education. The institution then
uses this Student Eligibility Rating (SER) to calculate the Basic Grant award based on full or part-time enrollment and the cost to attend the institution. All eligible students are awarded grants.

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

**Work-Study Program**

The College Work-Study Program provides employment for students who need financial assistance. A student works part time while attending the University and during vacation periods. Students engaged in this program work on the campus.

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

**Graduate Fellowships and Assistantships**

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

**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 Program**

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 program is designed to supplement the traditional undergraduate activities by providing the student practical experience in his or her chosen field. 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 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 undergraduate students in the fields of engineering, physical sciences, mathematics, and business.

Any person admitted to UAH as a 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.

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, 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.

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

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

Graduate Record Examination Fee Waiver Program

UAH is a corporate institute for the Graduate Record Examination (GRE) Fee Waiver Program. These waivers are limited to senior students receiving financial assistance through the University whose parents' financial contribution is estimated to be zero for the applicant's senior year in college.

Information and Fee Waiver Certificates may be obtained in the Financial Aids and Placement Office.
Veterans Affairs

The University of Alabama in Huntsville offers a full range of services to the student attending under the Veterans Administration Educational Assistance program. These services include veterans' advisement, educational loans, and the veteran tutorial program.

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

The Veterans Administration will make full payment only when the student'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 Morton Hall.

It is the student's responsibility to remain in good standing with the Veterans Administration and to respond to notification of changes in regulations.

For additional information, write to Veterans Administration Regional Office, 474 South Court Street, Montgomery, Alabama 36104.

Many students who are children of veterans of World War I, World War II, or the Korean 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.

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 shown in Financial Information section.

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. Housing regulations and policies which are supplemental to this catalog are contained in the brochure "Community Housing" and in the rental agreement which residents sign. Students interested in University Housing are responsible for obtaining this supplemental information. Application forms and additional information may be obtained from the Office of University Housing, P.O. Box 1247, The University of Alabama in Huntsville, or by calling 895-6108.

Pre-School Learning Center

Pre-school age children of student, faculty or staff parents are eligible for enrollment in the University's Pre-School Learning Center. A stimulating environment is provided daily at the Center, according to a fundamental philosophy which holds that learning should be fun. In addition to cognitive development, the Center focuses attention on
social, physical, and emotional development of the children enrolled. The Center is staffed by professional teachers and well-qualified teacher aides, each of whom is attentive to the needs of individual students. The center has several attendance plans to accommodate the various schedules of student parents, including hourly rates for afternoon care. The program is funded by tuition paid by the parents. The Center also receives support from the UAH student activity program and the University. Information may be obtained by calling 895-6573.

Office of High School and Junior College Relations

Anyone interested in enrolling at UAH will find the services of this office helpful. The counselors in this office can provide prospective students with information regarding academic and extra-curricular programs at UAH as well as admission and financial aid application information. Campus tours, individual or group, may be arranged through this office as well as appointments to meet faculty members in the prospective student’s areas of interest. The Office of High School and Junior College Relations also administers the annual Candlelight Luncheon for Principals, Counselors, and Outstanding High School Students, conducts the North Alabama Science and Engineering Fair, and assists with new student orientation and registration. As an element in the Division of Student Affairs, the staff members are also involved in advising several student groups. The office is located in Room 227, Morton Hall. The telephone numbers are 895-6670/6671.

University Union

Union facilities are open to the entire University Community—students, faculty, and staff. Regular hours are Monday through Friday; 8:15 a.m.-10:00 p.m.

Lounges

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

Game Room

Foosball tables, electronic games, flipper machines, etc., are provided for the relaxation and recreation of students on the second floor of the University Union.

Meeting Rooms

The large Multipurpose Room on the first floor can accommodate up to 700 people for large meetings and special events. A small Meeting Room is available on the second floor.

Offices

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

Union Snack Bar

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

Shower Facilities

Men's and women's shower facilities are located on the first floor next to the Multipurpose Room.

Student Sponsored Activities

Films, lectures, dances, and dramatic productions sponsored by the SGA are generally held in the Union.

Textbook and Supplies

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

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

Regular hours for both stores: Monday-Thursday—9:00 a.m. to 6:00 p.m.; Friday—9:00 a.m. to 5:00 p.m. Special hours for the first week of classes will be announced.

Activities

Student Government Association

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

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

The SGA sponsors many student services such as health insurance, a store discount plan, special rates for community cultural events, and information about local services.
The SGA works closely with all student activity programs, including Entertainment Series, Film Series, Dance Theatre, Free University, Symposium and Lecture Series, the University Playhouse, and Arts Series. The SGA provides students with a grievance officer, a used textbook exchange, a book club, and a telephone information service, “Hotline.” The number is 895-6724.

Student Organizations

American Institute of Industrial Engineers

The object of this chapter is to promote the profession of Industrial and Systems Engineering through the organized effort of this group in study, research and discussion. Monthly meetings featuring guest speakers, films, or plant tours are presented to acquaint the student body with the ideas, purposes and objectives of industrial engineering. Membership is open to all full-time undergraduate and graduate students in Industrial and Systems Engineering.

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. The BSU operates a student center located adjacent to campus on Holmes Avenue.

Biology Club

The objective 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.

Business Club

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

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.
College Bowl Team

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

University Christian Student Center

The UCSC is an organization sponsored by the Churches of Christ in this area to provide the atmosphere of a "home away from home" for students who come from out of town to study. The three main areas of activity are: spiritual, recreational/fellowship and service projects.

Circle K

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

Collegium Musicum

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

Engineering Society

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

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

Episcopal Student Fellowship

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

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

German Club

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

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 preselected 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.

Indo-American Association

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

International Society for Hybrid Microelectronics (ISHM)

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

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 premedical and predental students as well as those in nursing and allied health sciences. The purpose of the Association is to help its members fulfill the entrance requirements of the various professional schools across the nation and to acquaint them with opportunities in the health fields. Interviews with and lectures by 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 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.

Political Science Club

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

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.

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.

UAH Hosts-Hostesses

Several outstanding students are selected each year for their leadership and achievements to serve as public relations representatives of the University. Student Hosts-Hostesses greet and introduce the University to many exciting visitors and play an important role in helping major events on and off the campus run more smoothly. Any student interested in being considered for membership in this group should get in touch with the Dean of Students.

Academic Honor Societies

Alpha Kappa Delta

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

Alpha Lambda Delta

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

The Humanities and Behavioral Sciences Honorary is a school level honorary for students majoring in one of the disciplines of the School of Humanities and Behavioral Sciences. The purpose of this Honorary is to promote, encourage, and maintain academic excellence within the School of Humanities and Behavioral Sciences and to serve as a society in which those students who have demonstrated high academic achievement may organize and communicate with each other and with the academic community of the University. Standards for membership are: completion of 64 semester hours (at least 32 at the University), a cumulative grade point average of 2.5 or above and recommendation by a member of the H&BS faculty.

Kappa Pi

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

Omicron Delta Epsilon

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

Phi Alpha Theta

UAH has a chapter of Phi Alpha Theta, international history honorary society. Membership is open, by chapter invitation only, to history students who have completed a minimum of 12 hours in history with a quality point average of 2.5 and an overall average of 2.0 in all other courses.

Phi Delta Kappa

A number of UAH faculty and staff members are actively involved in the Huntsville Field Chapter of Phi Delta Kappa, national leadership fraternity in the field of education.

Phi Kappa Phi

The primary objective of the national Honor Society of Phi Kappa Phi is the recognition and encouragement of superior scholarship in all academic disciplines. The Society is convinced that in recognizing and honoring those persons of good character
who have excelled in scholarship, in whatever field, it will stimulate others to espouse excellence. Moreover, the Society feels that it serves the interests of the student capable of excellence by insisting that in order to acquire a chapter of Phi Kappa Phi, an institution provide the atmosphere conducive to academic excellence.

Psi Chi

Psi Chi is a national recognition society for students in the field of psychology. The purpose of Psi Chi are to encourage, to stimulate, and to maintain scholarship of the individual members in all fields, particularly in psychology, and to advance the science of psychology. To achieve these goals Psi Chi offers a wide range of programs at the local, regional and national levels. The requirements for admission are a 2.0 overall grade point average and a 2.0 in psychology, and 12 hours of psychology for a minor or 15 hours for a major.

Sigma Pi Sigma

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

Sigma Tau Delta

The UAH chapter of Sigma Tau Delta, a national English honorary society, is known as Upsilon Mu. The purposes of the chapter are to assist in developing, maintaining, and promoting literary, educational, and educational activities for the students and the alumni of the chapter as well as the entire university and civic community. Membership is open, by chapter invitation only, to English majors and minors of junior standing who have a 2.0 quality point average.

Sigma Theta Tau

The purposes of this society are to recognize superior achievement, recognize the development of leadership qualities, foster high professional standards, encourage creative work, and strengthen commitment to the ideal and purposes of the nursing profession. The Beta Phi Chapter of Sigma Theta Tau was installed at the University in the Spring of 1976.

Tau Beta

The Tau Beta Society, an honorary organization for engineering students, was chartered in February, 1977. The Tau Beta Society is open to students of engineering who have earned at least 24 credit hours at UAH and have either junior or senior standing. If the student is a junior, he or she must be in the upper one-eighth of the class, and if a senior, the upper one-fifth of the class as determined by work done at UAH.
Cultural and Entertainment Programs

The University Arts Series

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

UAH Film Series

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

Dance Theatre

This program exists to acquaint students with contemporary, creative dance. Performances are given throughout the year culminating in an annual performance in the Spring known as “This ‘N That,” (TNT), usually performed at Springfest.

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 “One Flew Over the Cuckoo’s Nest,” “Godspell,” and “You Are A Good Man Charlie Brown.”
UAH Music Ensembles

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

Choral Organizations

UAH Choir

The Choir performs choral literature of the great masters of music history as well as folk music of various countries. Attendance at all rehearsals and performances is required. By audition with conductor.

Premier Singers

The Premier Singers is a spirited group of young people who perform popular music and provide light-hearted entertainment for the campus and community. No audition required.

Huntsville Village Singers

The Village Singers is a small, elite group of mixed voices which performs madrigals and choral chamber music as well as choreographed tunes and medleys from Broadway and Hollywood. This group was selected for USO overseas tours in 1972 and 1974. By audition with conductor.

Choral Union

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

Summer Chorus

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

Music for Awhile Ensemble

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

Chamber Ensembles

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

Huntsville Symphony Orchestra

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

UAH Jazz Workshop

A workshop experience providing students with instruction in jazz arranging and composition, and in improvisation. Performance of both written and improvised jazz is stressed. By audition with instructor.

UAH Wind Ensemble

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

Summer Band

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

University Brass

A musical organization for the rehearsal and performance of selected ensemble literature for brass instruments. Size varies from trios to large brass ensembles. By audition with Instructor.

Pep Band

The Pep Band reflects the spirit and excitement of a growing university. This informal aggregation plays at UAH home basketball games. No audition necessary. Non-credit.
Intercollegiate Athletics

UAH currently sponsors intercollegiate athletic programs in basketball, tennis, 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 (Men)

Varsity basketball at UAH was initiated during the 1973-74 season. The Chargers play a full Southern States Conference schedule in addition to such nationally recognized nonconference opponents as Kentucky State, Tennessee State, University of Tennessee at Chattanooga and Illinois State University. The Chargers are defending conference and district champions in both the 75-76 and 76-77 seasons and were voted the top small college team in Alabama in 1976. The Chargers advanced to the NAIA National Basketball tournament in Kansas City during the 75-76 and 76-77 seasons and finished among the top eight teams in 75-76 and the top sixteen in the 76-77 tournament.

Basketball (Women)

UAH offered competitive intercollegiate basketball for women beginning with the 1977-78 season. The team is a member of the Alabama Association of Intercollegiate Athletics for Women (AAIAW) and the Association of Intercollegiate Athletics for Women (IAIAW). The team plays a regional schedule.

Soccer

In its four years of NAIA competition, the UAH soccer team has gained the reputation as one of the strongest teams in the South, competing against soccer powers like Clemson, South Florida, and Campbell College. UAH was the District 27 and Area 5 champions during the 1976 season and advanced to the NAIA National Championship Tournament held at the Rose Bowl in Pasadena, California, ending up ranked 7th in the nation. In 1977 the Chargers finished second in Area 5 and was the host team for the NAIA National Soccer Tournament which was held at Charger Field in Huntsville.

Tennis (Women)

UAH initiated a women's intercollegiate tennis team during the 1977-78 season. This team is affiliated with the AAIAW and AIWA and plays matches against teams from throughout the southeast.

Club Sports

Rowing

Rowing is the oldest sport at UAH. The Rowing team is a charter member of the
Southern Intercollegiate Rowing Association (SIRA) and the National Association of Amateur Oarsmen (NAAO). The men's and women's crews compete against schools such as Notre Dame, Jacksonville State University, Purdue University and Florida Tech. The Crew also participates in several regattas, and the 1972-73 lightweight four-oared crew won the Doc Bradley Trophy, symbol of the national small college lightweight championship.

Rugby

The UAH Rugby Football Club was founded in the Fall of 1974 and now competes in the 16 team Mid-South Rugby Union composed of schools such as Vanderbilt University, University of Kentucky, and the University of Tennessee. In the past two seasons UAH has finished second and third in the Conference Tournament.

Track

A Track Club was established in the Fall of 1977 to provide competitive running events open to all members of the University community. Non-competitive activities related to the sport of running are also provided by this Club.

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 the planning, supervising, and administering of 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 "foosball" are also scheduled.

Fraternities and Sororities

At present, there are six national fraternities and sororities on campus. The three fraternities are Alpha Tau Omega, Delta Chi, and Pi Kappa Alpha. The three sororities are Delta Zeta, Kappa Delta, and Chi Omega. For more information about the fraternities and the sororities, please contact the Dean of Students Office, 895-6240.

Spirit Organizations

Cheerleaders

The UAH Cheering Squad is composed of ten regular members and two alternates with a proportionate ratio of males and females. The primary purpose of the Cheerleaders is to promote spirit, enthusiasm, and support for intercollegiate athletics on the campus.
All Cheerleaders must be students who are currently enrolled as a freshman, sophomore, junior, or senior and are required to maintain a minimum of a 1.0 (C) quality point average.

Charger Angels

This precision dance team performs at athletic events and represents the University on other occasions. Team membership is open to any student on a competitive basis. Precision dance team experience is beneficial. The team conducts clinics for aspiring candidates and for high school team members. Contact the Dean of Students Office for additional information about participation.

Student Publications

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

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

Academic Advisement and Information Center

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

Freshmen (students who have completed 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 at the Nursing Building. All other undergraduates enrolled as "special students" must also have their schedules validated each term at the Advisement Center as long as they remain under this classification.

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.

Rules and regulations stated in this Catalog are subject to review for extenuating circumstances. Students are encouraged to use the services of the Academic Advisement and Information Center for the appropriate procedure of appeal.

Courses of Instructions

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

Courses are described under the sections of the various schools.
Course Numbering System

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

Student Classification

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

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

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

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

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

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

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

Students who violate any of the foregoing laws, regulations, or policies are subject to University disciplinary action as provided in the UAH Student Judicial Code and/or arrest and prosecution by civil authorities, as appropriate. Similarly, faculty/staff personnel who violate these laws, regulations, or policies are subject to adverse employment action, including dismissal, and/or arrest and prosecution, as appropriate.

Officers in the UAH Campus Security Office are by statute charged with all the duties and vested with all the power, such as that of arrest, of police officers. Violations should be promptly reported to this office and full cooperation given it in the discharge of its responsibilities.

Confidentiality of Records

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

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

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

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

Personally identifiable information will be transmitted by the University to a third
party only on the condition that the recipient not permit any other party to have access to it
without the student's consent.

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

The following officials have been designated as records officials for student records
within their respective areas:
1. Director, Admissions and Records.
2. Director, Academic Advisement Center.
3. Chairman, Nursing, Lower Division
4. Director, Continuous Education
5. Dean of Students.

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

Any student who believes that his rights under the Act have been violated by the
University may file a complaint with The Family Educational Rights and Privacy Act

Marital, Parental, or Temporary Disability Status

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

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
noncredit 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 times 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 a language placement examination provided he has taken in high school two or more
years of the language in question. A student does not take language placement test if he:
(1) has had less than two years of a language in high school; (2) has been out of formal
language training over four years; or (3) is taking a foreign language for the first time.
Students desiring to register for Chemistry 121 must (1) be placed into CH 121 from the
results of the chemistry placement exam, or (2) have taken CH 101 or its equivalent.

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—$9.00; 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 47 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; 55-59 = B; 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; 59-80 = A</td>
<td></td>
</tr>
<tr>
<td>*Analysis and Interpretation of Literature (with essay) and College Composition (composite score)</td>
<td>EH 101, 102</td>
</tr>
<tr>
<td>60-62 = B; 63-80 = A</td>
<td></td>
</tr>
<tr>
<td>Elementary Computer Programming—Fortran IV</td>
<td>EG 196</td>
</tr>
<tr>
<td>54-58 = B; 59-80 = A</td>
<td></td>
</tr>
<tr>
<td>General Chemistry (must first take placement exam)</td>
<td>CH 121, 123, 125, 126</td>
</tr>
<tr>
<td>48-52 = C; 53-61 = B; 62-80 = A</td>
<td></td>
</tr>
<tr>
<td>Introductory Accounting</td>
<td>AC 211, 212</td>
</tr>
<tr>
<td>57-62 = B; 63-80 = A</td>
<td></td>
</tr>
<tr>
<td>Introductory Business Law</td>
<td>BUS 321</td>
</tr>
<tr>
<td>57-62 = B; 63-80 = A</td>
<td></td>
</tr>
<tr>
<td>Introductory Macroeconomics</td>
<td>EC 142</td>
</tr>
<tr>
<td>55-59 = B; 60-80 = A</td>
<td></td>
</tr>
<tr>
<td>Introductory Microeconomics</td>
<td>EC 143</td>
</tr>
<tr>
<td>55-59 = B; 60-80 = A</td>
<td></td>
</tr>
<tr>
<td>Introductory Sociology</td>
<td>SOC 100</td>
</tr>
<tr>
<td>Statistics</td>
<td>BUS, EC, PSC, PY, SOC 231</td>
</tr>
<tr>
<td>54-61 = B; 62-80 = A</td>
<td></td>
</tr>
<tr>
<td>Western Civilization (with essay)</td>
<td>HY 101, 102</td>
</tr>
<tr>
<td>56-62 = B; 63-80 = A</td>
<td></td>
</tr>
</tbody>
</table>

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

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

If a student does not pass the test(s) no record is placed on his transcript. You may repeat a General Examination or Subject Examination six months after initial testing.

Credit by subject examination is not allowed unless the appropriate academic department has accepted the CLEP test for use by the University. Some departments offer credit by examination on tests constructed by the department. In all 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 received in a course, or (3) to satisfy the residence requirement for graduation. The departments in which you may challenge courses are listed below.

**UAH Credit By Department Examination**

- Computer Science: All Courses
- Modern Languages: Contact Department Chairman
- Music: MU 101, 102, 103, 110, 201, 202, 311, 312
- Nursing: Contact Nursing Advisement Office
- Philosophy: PHL 102, 220
- Sociology: All courses except 100, 231, 390, and 401 (Contact Department Chairman)

For further information concerning CLEP contact the Office of Counseling and Testing, Room 220, Morton Hall; Telephone 895-6445.

**Registration**

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

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

**Schedule Changes**

Once a student has completed registration, all changes in his schedule must be made on a Change of Course Form and recorded in the Office of Admissions and Records.

**Credit to Audit**

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

**Removal of Course from Schedule**

1. In the case of a cancelled class, submission of a Change of Course Form by the student helps to correct his record.
2. In the case of a “drop before class,” a Change of Course Form must be submitted prior to the first scheduled meeting of the class.
3. Except in the case of (1) or (2), removal of a course after the first scheduled meeting of a class is considered a withdrawal (see below).
Other Kinds of Changes

The following kinds of changes may be accomplished only during the designated hours of regular and late registration (see UAH calendar).

1. Change from one course to another.
2. Change from one section to another section of the same course.
3. Addition of course to schedule.
4. Change from audit to credit. Only students who are otherwise eligible to take the work for credit will be permitted to make this kind of change.

How to Withdraw

A student may withdraw from one or more courses or from UAH by completing the Request for Withdrawal Form secured from the Office of Admissions and Records. Regardless of the circumstances under which withdrawal becomes necessary, a student must carry out withdrawal procedures as follows:

1. A written request for withdrawal must be presented by the student to the Office of Admissions and Records. A receipt for each such request will be issued, and the transaction will not be considered complete until the receipt is issued.
2. The official date of withdrawal is the date on which the written request is received and the receipt issued by the Office of Admissions and Records.
3. A student may withdraw from one or more courses during the first three weeks of the term with a grade of W.
4. After the first three weeks and through the eighth week of the term, a student may withdraw from one or more courses at his discretion. The grade of W or WF will be assigned by each instructor and grades assigned will be based on student performance to date of withdrawal.
5. After the beginning of the ninth week, a student may not withdraw from a course. If it becomes impossible for a student to attend after the beginning of the ninth week, the instructor may assign a final grade of A, B, C, D, or F (U or S in appropriate courses). The instructor may also assign an I, giving the student additional time to complete course requirements. Under extenuating circumstances, an instructor may appeal for exception on behalf of the student to the dean of the school in which the student is enrolled. Students may use the services of the Academic Advisement and Information Center for interpretation of the appropriate procedures for students’ appeal. Such exception, if granted, would permit withdrawal under the provisions contained in paragraph 4 above.

Repeating a Course

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

Class Attendance

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

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

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

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

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

Grades

<table>
<thead>
<tr>
<th>Grades</th>
<th>Quality Points/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>

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

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

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

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

A grade of P (passing) or F (failing) is assigned in some courses. (See following section on Pass-Fail System.)
Change of Grade

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

Student Grade Report

At the completion of each term, a report of final grades is mailed to the address furnished by the student.

A statement of a student's satisfactory or unsatisfactory academic performance will be provided, upon request, to the individual or agency sponsoring the student's tuition, if the individual or agency submits a statement certifying grade release and unless written notification to the contrary is submitted by the student to the Office of Admissions and Records prior to the final examination period.

Quality Point Average

The quality point average is computed by dividing the total number of quality points earned by the total number of semester hours attempted. Courses in which a grade of W, P, or S 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 a cumulative total of 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 a cumulative total of 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.

In determining eligibility for honors, 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 at UAH, he is placed on scholastic probation.

After the first evaluation, a full-time student’s record is examined at the end of each term. 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).

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

<table>
<thead>
<tr>
<th>If Overall* Quality Point Average Is</th>
<th>Quality Point Average on Block of Work Being Reviewed</th>
<th>Quality Point Deficiency**</th>
<th>Action Indicated</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 or higher</td>
<td>1.0 or higher</td>
<td>7 or less</td>
<td>Probation Removed</td>
</tr>
<tr>
<td>Less than 1.0 and Less and 1.0 and</td>
<td>Less than 1.0 and Less than 1.0 and</td>
<td>More than 7</td>
<td>Suspension</td>
</tr>
</tbody>
</table>

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

**Including transferred deficiencies.

A student suspended for scholastic reasons is eligible to return on scholastic probation at the beginning of the second term following suspension.

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

Declaring a Major

At the end of the sophomore year, all students pursuing a B.A., B.S., or B.S.B.A. degree should file a Request to Declare 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 wishing to exercise a P-F option must make application at the Office of Admissions and Records before the end of the late registration period.

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

Visiting Student Program

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

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

Reserve Officers Training Corps (ROTC)

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

Application for Graduation

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

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

Second Bachelor's Degree

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

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

Time Limits

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

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

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

The first copy of a transcript is free; a charge of $2.00 is made for each additional transcript issued. No charge is made for transcripts issued to other units of The University of Alabama System.

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

Correspondence Study and Other Non-Resident Credit

Persons interested in taking correspondence study courses through The University of Alabama in Tuscaloosa may write to the Independent Study Division, The University of Alabama, 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 and professional certificate programs.

Undergraduate Schools' Majors and Degrees

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

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

School of Humanities and Behavioral Sciences

Areas of study in which majors are currently offered are:

Art
Business (Options in Accounting, Finance, Management, Marketing)
Criminal Justice
Economics
English
French
German
History
Music
Music Education
Political Science
Psychology
Slavic Studies
Sociology

Other areas with course offerings are: Communications, Education, Linguistics, Philosophy, Russian, Spanish, and Physical Education.
School of Science and Engineering

Areas of study in which majors are currently offered are:

- Biology
- Chemistry
- Electrical Engineering
- Structural Engineering
- Mechanical Engineering
- Industrial and Systems Engineering
- Mathematics
- Mathematics Education
- Physics

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

School of Nursing

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

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 Science—Biology, Chemistry, Mathematics, Mathematics Education, Physics.
- Bachelor of Science in Business Administration—Accounting, Finance, Management, Marketing.
- Bachelor of Science in Engineering—Unified Programs with Professional Specializations.
- Bachelor of Science in Nursing—Unified Professional Program with Selected Minor or Secondary Area of Concentration.

Total Degree Requirements

1. Minimum requirements for the Bachelor of Arts, Bachelor of Science, Bachelor of Science in Business Administration, and Bachelor of Science in Nursing degrees are 128 semester hours; for the Bachelor of Science in Engineering degree, 129 semester hours; and for the Bachelor of Arts in music, 134 semester hours. A minimum of 25% of the total requirements and 12 of the last 18 hours must be completed at UAH. Also, unless otherwise specified by the department involved, a minimum of 12 semester hours of upper level courses (numbered 300 or above) must be completed at UAH in a student's AOC (6 hours in his major and 6 hours in his minor or cognate studies). (AOC is defined on pages 59-60.) 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 credit by examination allowed towards a bachelor’s degree is 25% of the degree requirements.

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

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 language. Specific requirements for general education have been identified for each degree. Courses which are included both in general education requirements and also in either the major or 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 Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Composition</td>
<td>6</td>
</tr>
<tr>
<td>Survey of English Literature</td>
<td>6</td>
</tr>
<tr>
<td>Origins and Development of the Contemporary World</td>
<td>6</td>
</tr>
<tr>
<td>Economics, Political Science, Philosophy, Psychology, or Sociology (one discipline)</td>
<td>6</td>
</tr>
<tr>
<td>[If major is psychology, the social sciences requirement should be taken in one of the other disciplines.]</td>
<td></td>
</tr>
<tr>
<td>Foreign Language</td>
<td>6-12</td>
</tr>
<tr>
<td>(See section entitled Modern Foreign Languages.)</td>
<td></td>
</tr>
</tbody>
</table>

Science—Mathematics

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

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

a. 6 hours mathematics; 8 hours one laboratory science
b. 8 hours in each of two laboratory sciences

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

d. 3 hours mathematics; 12 hours natural science sequence (NS 111, 112, 113)
General Education Requirements for the Bachelor of Science Degree

Humanities & Behavioral Sciences

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

(See section entitled Modern Foreign Languages.)

Science—Mathematics

8 hours in each of two sciences selected from biology, chemistry, physics

Mathematics

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9</td>
</tr>
</tbody>
</table>

II. The Area of Concentration (AOC)

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

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

A composite major may be developed from courses in more than one discipline. Guidelines for such majors should be identified by the department involved and approved by the Vice President for Academic Affairs. Explicit course programs are subject to approval by all disciplines concerned and must meet minimum standards as set forth above.

Within the same degree a student may elect to complete requirements for more than one major. Such an AOC must receive the approval of each department in which a major is declared.

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

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

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

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

The AOC Form is a document prepared cooperatively by a student and a responsible faculty advisor, with the prior assistance of the Office of Admissions & Records in preparing the evaluation of transfer credits and in reviewing general education requirements. 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. Once the AOC form has been accurately completed, checked in the dean’s office, and signed by the appropriate individuals, it becomes a contract between the student and the University with responsibilities bearing on both parties.

III. Electives

Electives are courses taken by the student beyond the requirements identified in I and II above. A minimum of 12 hours of electives must be chosen from disciplines not included in the AOC.

IV. Requirements for Teacher Certification

Teacher Certification Requirements are set by the Alabama State Department of Education, and are identified in a student’s program as follows:

a. Secondary Education. These courses are specified electives which a student may choose in order to qualify for a Class B Secondary Teaching Certificate along with his appropriate major and minor.

b. Elementary Education. A student seeking elementary certification chooses the prescribed courses as a minor. This group of courses then becomes an integral part of the AOC and is subject to the prescriptions therefor.
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 Program

To be admitted to an accredited law school, the student must have a bachelor's degree, an acceptable score on the Law School Admissions Test (LSAT), and, in most cases, an accumulative grade-point average of B or better. The LSAT should be taken in July or October of the year before the student plans to enter law school. Applications to law school, together with test scores, transcripts, and recommendations, should be submitted to law schools not later than January 1 of the year the student plans to begin law school. For specific admission requirements, consult the catalog of the law school one wishes to attend.

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

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

All pre-law students should seek academic counseling from pre-law advisors in the Department of Political Science. Materials and information requirements are available in the Department of Political Science and the Academic Advisement Center. The official Pre-law Handbook may be consulted in these offices or ordered from the Law School Admissions Services, Box 944, Princeton, New Jersey 08540.

Pre-Medical and Pre-Dental Programs

Most students entering medical or dental schools do so after earning an undergraduate degree. After consulting the specific requirements of the desired medical or dental school, applicants interested in careers in medicine or dentistry will find that UAH offers programs that will prepare them for admission to the professional school.
Competition for admission to medical and dental schools is great, and students should realize that completion of the admission requirements does not insure acceptance. Since admission to the schools is not assumed, students are advised to complete undergraduate degree requirements.

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

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

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

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

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

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Biology ......................................................... 8</td>
</tr>
<tr>
<td>2. Inorganic chemistry (including qualitative analysis) ................. 8</td>
</tr>
<tr>
<td>3. Organic chemistry ................................................. 8</td>
</tr>
<tr>
<td>4. Quantitative analysis .............................................. 4</td>
</tr>
<tr>
<td>5. Physics (including laboratory) ..................................... 8</td>
</tr>
<tr>
<td>6. College algebra and trigonometry ................................... 6</td>
</tr>
<tr>
<td>7. 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 .................................................. 30</td>
</tr>
<tr>
<td>8. The completion of a minimum of 90 semester hours of collegiate work.</td>
</tr>
</tbody>
</table>

Students should elect courses in mathematics through calculus and should not elect biology courses that constitute a part of the dental school curriculum.

Students interested in pre-professional health programs (pre-dentistry, pre-medicine, pre-optometry, pre-veterinarian medicine) are encouraged to contact the Pre-professional Advisor by calling the Office of the Dean, School of Science and Engineering.

**Medical Technology**

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

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

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

Education—Teaching Certificates

A student may complete professional requirements for a Class B Elementary or Secondary Professional Teaching Certificate in any of the approved major areas of concentration, a Class B Elementary-Secondary Professional Certificate in Art, and a Class A Special Education Professional Certificate with an endorsement in learning disabilities. Students interested in a degree in education involving programs in other major areas may complete much of the course work at UAH. When preparing such programs, a student should consult the requirements of the particular school to which he may transfer.

Environmental Science Certificate Program

A student may elect to follow a program of environmental science courses leading to a Certificate in Environmental Science. A fully prepared student can earn the Certificate while completing the requirements for the bachelor's degree in mathematics, science, or engineering without any additional hours (see also p. 183). The program includes basic science courses, most of which would normally be included in the curriculum; a core of four courses in ecology, climatology and meteorology, geology and hydrology, and pollution problems; and any two of several advanced environmental science and engineering courses. In completing the program the student also satisfies the requirements for a minor in Environmental Science.
School of Humanities and Behavioral Sciences

Dean: Jon G. Rogers, Professor of Psychology

The humanities and the behavioral sciences contribute substantially to the understanding of man's relation to himself, to his fellow man, and to the physical and biological world in which he lives.

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

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

Undergraduate Degrees and Study

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

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

1. An established minor drawn from one department offering a major at The
University of Alabama in Huntsville. The minor 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 minor 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 group of courses designated as cognate studies 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 minor chosen by a student is subject to the approval of the chairman of the department offering the minor. Any area of cognate studies chosen by a student is subject to the approval of the chairman of the student’s major department. All AOC's are subject to approval by the Dean of the School. Each major department has developed appropriate areas of concentration 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 Program

The School of Humanities and Behavioral Sciences offers Master of Arts degrees in English and history and two interdisciplinary graduate degrees, the Master of Arts in developmental learning and Master of Administrative Science. Requirements for these degrees and course descriptions are listed in this section.

Administrative Science

A Master’s Degree Program

Professor: Bucher (director); Associate Professor: Olsen

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, except in the Education Administration option which requires 18 credit hours in a core curriculum and 18 hours in the option. Options are available in administrative science, economics, education 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. The program is thought of as professional in character; therefore, no thesis is required but the student must show by a research paper, in one or more of the courses, his investigative and analytical abilities.

To be admitted to the graduate program in administrative science, a student must meet the general requirements to Graduate School as indicated on page 245 of this catalog.

After completing the course requirements the student must pass the comprehensive oral examination administered by a committee of graduate faculty members.
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 administration’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 purpose are studied. The relationships between planning, direction, coordination and control are identified and discussed.

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

626 Business Decision Economics 3 hrs.
Introduction to the economic and financial problems of business, the decision-making techniques for solving these problems. Emphasizes practical management decision problems related to the use of organizational resources. Covers business objectives, demand, market structure, costs, cash flow and various economic decision technique. (Not required of Education Administration Option students.)

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

Elective Courses

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.

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 24 hours of their curriculum may, with the approval of the director of the Administrative Science Program, 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, except in the Education Administration option, which requires 18 credit hours in a core curriculum and 18 hours in the 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
    Electives: AS 631, AS 632, AS 633

Computer Science Option
    Required: CS/EG 511
    Electives: CS 612, CS/EG 513, CS/EG 517, CS/EG 690, CS 703, CS/EG 520,
               CS/EG 524, CS/EG 530

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

Education Administration Option
    (This option leads to the Class A certificate. A prerequisite to the Class A certificate is
    eligibility for a Class B Certificate.)
    Required: ED 600, ED 602, ED 606, ED 647, ED 648, ED 649
    Electives: ED 500 (approval of the Education Department required), ED 603,
               ED 604, ED 608, ED 610

Industrial & Systems Engineering Option
    Required: EG 525, EG 627
    Electives: EG 523, EG 526, EG 621, EG 632, EG 633, EG 634

Operations Research Option
    Required: EG 525, EG 625
    Electives: EG 527, EG 621, EG 629, EG 634, EG 635, EG 637

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

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

Art

Professor: Bayer (chairman); Associate Professors: Dempsey, Pope; Assistant Professor:
Sarn; Instructor: Bernardi

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

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

All of the studio courses require supplies to be secured by the student with substantial
amounts required in some of the courses. Those students who have funded support
should include an amount for supplies in their request. Since some studio courses do not
require textbooks, the net cost to the student is reduced to this extent.

An art student transferring to UAH from another institution must submit
information on previous training and representative samples of his art work to the art
faculty for evaluation. This should be done in advance of initial registration. Advanced
placement in regard to UAH art courses will be determined by the Art faculty. Candidates
for a degree with a specialty in art who transfer to UAH must take at least 12 semester hours of art courses numbered 300 or above at UAH. A student having a cluster in art must take at least 8 semester hours of this work at UAH.

Selected examples of a student’s art work may be retained at the discretion of the art faculty to add to a permanent collection.

Opportunities for upper division specialization within the art degree program are offered in art history, painting, communication graphics, sculpture, printmaking, and art teacher training. Communication graphics consists of courses in advertising layout, typographic and lettering design, commercial art processes, and film animation techniques. A free informative booklet “Careers in Communication Graphics” is available on request from the art department. Painting includes courses in mixed media and film making.

Area of Concentration (AOC) with Art Major

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

Plan I Art Program

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

   This program consists of 16 courses (48 semester hours) of studio work. It provides the basic vocabulary plus two years of specialization in the chosen area. The program includes no art history. An area of cognate studies including art history or an art history minor may be elected. The cognate studies or minor in art history must be made in consultation with the departmental advisor.

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

   Design ..........................................................120 and 121
   Sculpture ..........................................................140 and 141
   Drawing (choose three of the following) ...160, 161, 162, 163, 167, or 180 (printmaking)
   Photography ....................................................165

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

   Communication Graphics ..................................300, 331 and 332
   Sculpture (choose three of the following approved by professor) ..........340
                                   341, 342, 343, 344, or 345
   Painting ..........................................................370, 371 and either 372 or 374
   Printmaking (choose three of the following approved by professor) ....380
                                   381, 382, 383, 384, 385, or 386

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

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

No other studio courses should be taken while completing senior requirements.

*Art History Cognate Studies or Minor*—ARH 100 and 101 must be taken during the first two years. During the junior and senior years: (a) For the Cognate Studies, three courses in art history at the 300 level or above and two courses in related disciplines approved by art history professor; (b) For the Minor, five courses in art history at the 300 level or above must be completed.

2. Major in Art History Specialty

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

*Lower Division Program* (27 semester hours)—During the first year ARH 100 and ARH 101 should be completed. Three courses at the 300 level should be completed during the second year. Twelve hours of studio courses should be taken during the first two years (one course from each area: photography, sculpture, drawing, and design).

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

3. Major in Art with Teacher Certification

The programs for teacher certification available to art degree candidates offer a wide range of qualification for teaching in Alabama elementary, middle, secondary schools, or all three. It is possible through different combinations of the various elements of these programs listed below, to achieve several distinct kinds and qualities of employability in Alabama public and private schools. It must be noted that: (a) These general education requirements differ somewhat from those for other B.A. degrees; (b) A student interested in these programs must acquaint himself with the Education Department section of the catalog. In that section he will find detailed lists of general education requirements, professional courses, and much other information relevant to the programs outlined below; (c) Different combinations of the following elements may be grouped into programs that best serve the individual needs of the degree candidate. The three major programs are as follows:

*Program 1*—Class B Secondary Certificate to teach art full time, and the minor subject part time, in grades 7 through 12.

*General Education Requirements*  

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

Major Requirements (Art) .......................... 42 hours
Lower Division .................................... 21 hours
6 hrs. of art history, ARH 100 and 101, 15 hrs. of studio (5 courses) with at least one course at 100 level in each of three areas: design, drawing, sculpture, or photography. Prerequisites for upper division courses should be kept in mind when selecting these courses.
Upper Division .................................... 21 hours
3 hrs. of art history at the 300 level, ARS 370 or 371 and 15 hrs. (5 courses) in studio, including at least two areas in addition to painting. Printmaking ARS 382 or ARS 383 is recommended.

Education Department Requirements ................ 21 hours
ED 261 ................................................. 3 hours
ED 263 ................................................. 3 hours
ED 388 ................................................. 3 hours
ED 490 ................................................ 3 hours
ED 497 ................................................ 9 hours

Minor ................................................. 21 hours

Elective
Requirements are fulfilled with completion of education courses.

Total of 135-141 hours

Program 2—Class B Certificate to teach only art in all Grades (K-12).

General Education Requirements (as in Program 1) ............. 51-57 hours

Major-Cluster Composite Program (AOC) ..................... 60 hours
Studio ................................................ 42 hours
(including 12 hours upper division courses)
Art history ......................................... 15 hours
(including 6 hours upper division courses)
ARS 215 .............................................. 3 hours

Education Department Requirements .................. 21 hours
ED 261 ................................................. 3 hours
ED 263 ................................................. 3 hours
ED 388 ................................................. 3 hours
ED 490 ................................................ 3 hours
ED 492 and 498 ....................................... total 9 hours

Total requirements for this program: 132-138 hours
Program 3—Class B Certificate for Elementary Classroom Teaching with Art Specialty.

General Elementary Education Requirements
(including ARS 215) ........................................ 66 or 72 hours
See page 99 in catalog.

Major (Art) Same as in Program 1 42 hours

Cluster Education Program
See Supporting Cluster in Professional Education pp. 99-100. 27 hours

Total requirements for this program: 135-141 hours

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

Plan II Art Program for the Exceptional Student

Plan II involves a supplement to the major requirements stated under Plan I, Program 1 or Program 2. This program is designed for individuals who wish to meet the exacting demands of graduate study and for students of exceptional ability and commitment. Students who wish to enter this program must receive the consent of the Department Chairman not later than three terms prior to graduation.

Plan II requires 6 additional hours above the requirements for graduation. Plan II may be followed in two ways: (a) Independent study (6 hours—Art 490, 491) in the candidate’s specialty, leading to a one-man exhibition (for the studio specialist) or the presentation of a research paper at a seminar meeting in the last term of the senior year (for the art history specialist); or (b) 6 additional semester hours of work in art history may be scheduled by the studio major, or 6 additional semester hours work in studio may be scheduled by the art history major.

Supportive Art Minor

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.

UAH Gallery of Art

The UAH Gallery of Art is housed in what was originally the Union Chapel of Hazel Green, Alabama. The building was donated to the University by Mr. and Mrs. Franklin Bendall in 1973 and later was transported to the UAH campus and set on the original foundation stones. It was restored by volunteer labor composed of UAH students and faculty. Approximately 3,000 hours of work went into the restoration of the simple Greek Revival structure to its original circa 1840 condition. The interior was redone to accommodate the strict needs of a professional museum. It is located on the campus between Morton Hall and the Union Building adjacent to the Bicentennial Park. The Gallery is under the direction of an Art Department faculty member and is run entirely by
a student staff.
Exhibitions have included art nouveau glass, 19th century photographs, Victorian leaded glass windows, sculpture in a variety of media, prints and paintings, the state juried exhibition, fiber arts, and laser works.

**UAH Visiting Artist Series**

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

Some of the recent guests have been sculptors: Lyman Kipp, Jason Seley, Kenneth Snelson, Frank Gallo, Duane Hanson, and Kosso Eloul. The laser artist, Rockne Krebs and neon sculptor Stephen Antonakos were also participants. Art historians Barry Lewis and Elizabeth Gilmore Holt added depth to these programs as well as critic Donald Kuspit and painter Don Eddy.

**The FOCAL Annual Exhibition**

The University of Alabama in Huntsville student art organization, FOCAL, in conjunction with the art department sponsors the only state wide annual juried exhibition for Alabama college art students. The exhibition is entirely organized by FOCAL club members and is funded by Peoples National Bank of Huntsville. More than $1,000 is available each year in prize money. The juror is always from outside the state. The exhibition each spring is displayed in the UAH Gallery of Art. Peoples National Bank receives the purchase award for display until such time as it is returned to the University to be kept in the Peoples National Bank Collection which is housed and managed by the UAH Gallery of Art.

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

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

101 **Art History Survey: Renaissance Through Modern Art**
3 hrs.
Art and architecture of the Western World from the 15th through the 20th centuries examined in the light of social change and of the emergence of the artist as an individual.

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

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

121 **Color in Design**
3 hrs.
An investigation into the physiological, psychological, and physical properties of color, with experimental studio work in both the subjective and objective evaluation of color usage.
140 Sculptural Use of Organic Materials
Introduction in clay to three-dimensional form and space and practice in mold-making and casting techniques and the use of hydrocal materials as a constructive material.

141 Sculpture: Metal Assemblage
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, composition, etc.

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

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

163 Drawing with Collage
Introduction to drawing systems that involve assembling preformed visual materials. This course is especially valuable for developing skills in handling color, form, texture, and theory without the necessity of developing manual skills.

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

167 Drawing and Rendering for Illustration
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.

180 Introduction to Printmaking
Introduction to the technique of intaglio, planographic and relief printmaking with emphasis on drawing and design as applicable to these processes.

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

Upper Division

300 Colonial and 19th Century American Art
A survey of the visual arts in America prior to World War I. Prerequisite: ARH 101 or approval of instructor.

301 Classical Art
The art and architecture of Ancient Greece and their influence on the development of the visual arts of the Roman Empire. Prerequisite: ARH 100 or approval of instructor.

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

303 Renaissance Art
The visual arts of Italy from 1250 to 1550 taking into consideration the rise of the artist as a creative individual and his expanding role in society. Prerequisite: ARH 100 and 101 or approval of instructor.
**20th Century Art**

A survey of the trends in Europe and America from 1890 to the present day. Prerequisite: ARH 100 and 101 or approval of instructor.

**3 hrs.**

**Baroque Art**

The development of Baroque and Rococo Art in Italy, Spain and Northern Europe. Prerequisite: ARH 100 and 101 or approval of instructor.

**3 hrs.**

**Period Styles in Interior Design**

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

**3 hrs.**

**19th Century Art in Europe**

A survey of the development in European Art from 1760 to 1890. Prerequisite: ARH 100 and 101 or approval of instructor.

**3 hrs.**

**Fundamentals of Advertising Design**

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

**3 hrs.**

**Advertising Layout and Typographic Design**

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

**3 hrs.**

**Illustration**

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

**3 hrs.**

**Sculptural Use of the Thermoset Plastics**

Sculptural manipulation of thermoset resins and foams. Prerequisite: ARS 140, or approval of instructor.

**3 hrs.**

**Sculptural Use of the Thermoplastics**

Manipulation of thermoplastics by bonding, dyeing, forming, and welding. Prerequisite: ARS 140, 141, or approval of instructor.

**3 hrs.**

**Sculpture: Investment Casting**

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

**3 hrs.**

**Sculpture Workshop**

Extension and additional exploration of techniques of sculpture related to student's previous experience in the various sculptural media. Provides an opportunity for additional work in the areas of sculpture in which some competence has been developed. Prerequisite: ARS 140 and 141, and one or more of the 300 level courses in sculpture and approval of instructor.

**3 hrs.**

**Sculpture: Carving**

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

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

370 Oil Painting
An advanced course dealing with the fluid nature and brilliance of oil paints, essentially representational. Prerequisite: one of ARS 120, 121; and one of ARS 160, 161, 162, 163 or approval of instructor.

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

372 Mixed Media (Replicative)
Introduction to the studio practice with modern mass replicating media, film, sound and TV. Prerequisite: one of ARS 120, 121; and one of ARS 160, 161, 162, 163, or approval of instructor.

373 Painting
Painting in various media of the individual's choice. 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.

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

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

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

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

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

384 Graphics: Photo Intaglio Printmaking
Introduction to photo gravure techniques. Prerequisites: ARS 121 and one of ARS 160 or 162 or approval of instructor.

385 Graphics: Color Intaglio Printmaking
Introduction to various color intaglio methods. Included will be a presentation of stencil, multi-plate, reduction and viscosity techniques. Emphasis will be placed on the development of the unique aspects of the color image. Prerequisites: ARS 120 and one of ARS 160 or 162 or approval of instructor.
Graphics: Workshop 3 hrs.
An opportunity to continue printmaking work in an area in which the student has already gained some degree of skill. Heavy emphasis will be directed towards an understanding of the development of concept in the print image along with technical competence. Prerequisites: ARS 180 and one 300 level printmaking class or approval of instructor.

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

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

402 Art History Seminar: American Art 3 hrs.
Discussion and guided research on artists, works of art, and subjects closely related to art. The aim of the course is to teach the methods of developing a scholarly research paper. Prerequisite: ARH 100, 101, 102, and 300.

430 Advanced Studio Problems in Communication Graphics 3 hrs.
Individual content by consultation. Prerequisite: senior standing.

431 Advanced Studio Problems in Communication Graphics 3 hrs.
Individual content by consultation. Prerequisite: senior standing.

432 Advanced Studio Problems in Communication Graphics 3 hrs.
Individual content by consultation. Prerequisite: senior standing.

440 Advanced Studio Problems in Sculpture 3 hrs.
Individual content by consultation. Prerequisite: senior standing.

441 Advanced Studio Problems in Sculpture 3 hrs.
Individual content by consultation. Prerequisite: senior standing.

442 Advanced Studio Problems in Sculpture 3 hrs.
Individual content by consultation. Prerequisite: senior standing.

470 Advanced Studio Problems in Painting 3 hrs.
Individual content by consultation. Prerequisite: senior standing.

471 Advanced Studio Problems in Painting 3 hrs.
Individual content by consultation. Prerequisite: senior standing.

472 Advanced Studio Problems in Painting 3 hrs.
Individual content by consultation. Prerequisite: senior standing.

480 Advanced Studio Problems in Printmaking 3 hrs.
Individual content by consultation. Prerequisite: senior standing.

481 Advanced Studio Problems in Printmaking 3 hrs.
Individual content by consultation. Prerequisite: senior standing.
482 Advanced Studio Problems in Printmaking 3 hrs.
Individual content by consultation. Prerequisite: senior standing.

490 Independent Study 3 hrs.
Independent study in art history leading to a presentation of a research paper at a seminar meeting or independent work in studio specialty leading to a one-man exhibition in the last term of the senior year. This course must be followed by ARS 491.

491 Independent Study 3 hrs.
Independent study in art history leading to a presentation of a research paper at a seminar meeting or independent work in studio specialty leading to a one-man exhibition last term of the senior year. Prerequisite: ARS 490.

495 Technical Problems 1-3 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 research. Prerequisite: advanced standing, twelve hours of art history, previous course work in the area to be studied, and approval of instructor.

Business Administration

Professors: Bucher (chairman), Graves; Assistant Professors: Bryson, Fay, Marsh; Instructors: Billions, Edgeton, Garner, Howell, Smith.

Business Administration Programs

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

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

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 45-47 semester hours of General Education Requirements, complete an approved Area of Concentration (AOC) and take a minimum of 12 hours of electives chosen from disciplines not in the AOC. Courses which are included both in General Education Requirements and also the AOC are omitted in calculating hours in the AOC.
General Education Requirements

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Composition (EH 101-102 or EH 103-104)</td>
<td>6</td>
</tr>
<tr>
<td>Basic Speech Communication (CM 113)</td>
<td>3</td>
</tr>
<tr>
<td>College Algebra (MA 105) or Level II Placement</td>
<td>3</td>
</tr>
</tbody>
</table>

| Humanities                               | 15             |
| (Maximum of 6 hours in one discipline)   |                |
| Art, Communications (other than CM 113), Foreign Language, Literature, Music, Philosophy, or History | 9             |
| History or Literature (two courses in one discipline required) | 6             |

| Social Sciences                          | 12             |
| (Maximum of 6 hours in one discipline)   |                |
| Political Science, Psychology, or Sociology |            |

| Science and Quantitative Studies         | 6-8            |
| Computer Science (above CS 113), ECON 310, BUS 325, Mathematics (above MA 105), Science (Biology, Chemistry, Environmental Science, Natural Science, or Physics), or Statistics (above BUS 231) | |

Total 45-47

| Electives                                 | 29-24          |

Area of Concentration—Major Options. The following courses are required in all major options:

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 113 Introduction to Computing</td>
</tr>
<tr>
<td>EC 142 Principles of Economics I</td>
</tr>
<tr>
<td>EC 143 Principles of Economics II</td>
</tr>
<tr>
<td>AC 211 Principles of Accounting I—Financial</td>
</tr>
<tr>
<td>AC 212 Principles of Accounting II—Managerial</td>
</tr>
<tr>
<td>FIN 301 Principles of Finance</td>
</tr>
<tr>
<td>MGT 385 Operations Management</td>
</tr>
<tr>
<td>MGT 301 Principles of Management</td>
</tr>
<tr>
<td>MKT 301 Principles of Marketing</td>
</tr>
<tr>
<td>BUS 231 Statistics</td>
</tr>
<tr>
<td>BUS 321 Business Law</td>
</tr>
<tr>
<td>BUS 420 Business Policy</td>
</tr>
</tbody>
</table>

36

Additional Requirements for each major option are as follows:

**Accounting (AC)**

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

Finance (FIN)
FIN 352 Money and Banking .................................................. 3
FIN 375 Financial Institutions ................................................ 3
FIN 362 Security Analysis and Portfolio Management ............. 3
FIN 431 Managerial Finance and Policy Determination .......... 3
FIN 550 Seminar in Finance ..................................................... 3
FIN 554 International Finance ................................................ 3

Management (MGT)
MGT 361 Organizational Behavior .......................................... 3
MGT 363 Personnel: Human Resource Management .............. 3
MGT 430 Business and Society ................................................. 3
MGT 570 Seminar in Management ........................................... 3
MGT 362 Management and Labor Relations ......................... 3
MGT 405 Small Business Management ................................... 3

Marketing (MKT)
MKT 332 Consumer Behavior ............................................... 3
MKT 342 Promotional Strategy ............................................... 3
MKT 343 Market Research ..................................................... 3
MKT 345 Market Channel Structure and Strategy .................. 3
Six Hours From the Following:
  MKT 410 Marketing Management
  MKT 430 Business and Society
  MKT 560 Seminar in Marketing ........................................... 6

Supportive Business Administration Minor

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

Certificate in Accounting

Many individuals have expressed a desire to change career goals after receiving a bachelor's degree. One career goal that has been requested has been a preparation in the field of accounting. The state of Alabama requires that an individual have a bachelor's
degree (it need not be in accounting) and as many credit hours in accounting as the student would have had if he had majored in accounting. To meet the wishes of the students changing career objectives and to meet minimum requirements so that students may sit for the CPA exam in the state of Alabama, a Certificate in Accounting Program is offered for people who presently hold a bachelor's degree in some field other than Accounting.

The requirements for a Certificate in Accounting are set out below. It is anticipated that with the sequence of courses and prerequisites it would probably take approximately two years to complete this program.

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 113 Introduction to Computing</td>
</tr>
<tr>
<td>BUS 321 Business Law</td>
</tr>
<tr>
<td>AC 211 Principles of Accounting I</td>
</tr>
<tr>
<td>AC 212 Principles of Accounting II</td>
</tr>
<tr>
<td>AC 310 Intermediate Accounting I</td>
</tr>
<tr>
<td>AC 311 Intermediate Accounting II</td>
</tr>
<tr>
<td>AC 313 Income Tax I</td>
</tr>
<tr>
<td>AC 314 Cost Accounting</td>
</tr>
<tr>
<td>AC 415 Advanced Accounting</td>
</tr>
<tr>
<td>AC 431 Auditing I</td>
</tr>
<tr>
<td>One of the following: AC 432 Auditing II</td>
</tr>
<tr>
<td>AC 417 Government Accounting</td>
</tr>
<tr>
<td>AC 323 Income Tax II</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

The student must counsel with the Department of Business Administration and have the approval of the department chairman prior to enrollment in the program. A maximum of 9 hours will be accepted by transfer credit to apply to the Certificate in Accounting program.

**Business (BUS)**

231 **Applied Statistics for Social and Behavioral Sciences**

- 3 hrs.
- Collection, classification, and presentation of data, measures of central tendency, and dispersion, introduction to probability distribution and sampling theory, confidence limits and tests of significance, chi-square and "t" distribution. Prerequisite: MA 105, or college algebra or its equivalent, or the approval of the instructor. Same as PSC 231, PY 231, SOC 231, and EC 231.

311 **Computer Applications in Economics and Business I**

- 3 hrs.
- Business systems and data processing; impact of data processing methods on the economic structure of business; user communication, file design, report control, documentation; data bases, information collection, planning and control, systems design concepts. Includes ANSI COBOL. Prerequisite: CS 308. Same as EC 311 and CS 311.

321 **Business Law I**

- 3 hrs.
- Introduction to law; contracts; torts; sales and conditional sales; negotiable instruments; commercial paper; personnel; agency and employment. This course acquaints the student with basic free enterprise, legal concepts of contracts, and operation of the court system.

322 **Public Policy Toward Business**

- 3 hrs.
- Same as EC 322.
Intermediate Economic and Business Statistics 3 hrs.
Probability and probability distributions, sampling theory and statistical inference, analysis of variance, linear regression and correlation, analysis of time series, and index numbers and their construction. Prerequisite: BUS 231. Same as EC 325.

Business Law II 3 hrs.
Partnerships, corporations, legal problems of business organization, insurance, security devices, personal property, real property, leases and estate administration. This course acquaints the student with business organization and various problems affecting the enterprise. Recommended for Accounting Majors.

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

Business Policy 3 hrs.
A study of business strategy, policy, and management action which integrates the principles and methods acquired in the core curriculum. Analysis of comprehensive business cases provides opportunity to the student to acquire and develop skills in diagnosing and solving complex business problems. Prerequisite: Senior standing and completion of all core courses.

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

Accounting (AC)

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

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

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

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; study of accounting principles board (APB) opinions, financial accounting standards board (FASB) opinions; examination of analytical processes of statement preparation including funds-flow and cash-flow reporting in financial statements adjusted for price-level changes. Prerequisite: AC 310.

Income Tax I 3 hrs.
Determination of taxable income and selected aspects of tax accounting for individuals and businesses. Prerequisite: AC 311.
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 cost-product costing, cost-volume-profit relationships, flexible budgets, master budgets, overhead application, responsibility accounting, make or buy decisions, incremental analysis, and the influences of quantitative techniques on management accounting. Prerequisite: AC 212.

Income Tax II 3 hrs.
Tax accounting for partnerships, corporations, estates and trusts, and state income taxes, tax research and planning. Prerequisites: AC 313.

Advanced Accounting 3 hrs.
Partnership accounting, consignments, installment sales, foreign exchange, reorganizations and mergers and acquisition-business, combinations, home-branch accounting. Prerequisites: AC 310, 311.

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 311.

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

Auditing I 3 hrs.
Auditing theory and practice, working papers, financial statements, and professional ethics. Prerequisite: AC 311.

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

Studies in International Accounting 3 hrs.
A study of the differences in the principles of accounting and auditing standards, and auditing procedures in selected countries of the world. Prerequisite: AC 311 and senior standing.

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

Honors Seminar in Accounting 3 hrs.
Research in accounting, various readings in accounting, computer utilization, new topics in accounting; social accounting, pollution accounting, human resource accounting, marketing cost controllership, behavioral accounting. Prerequisite: written consent of instructor and senior standing.

Managerial and Financial Accounting 3 hrs.
A study of the basic financial statements, interpretation and interrelationships of financial data, quantitative concepts relating to management objectives, managerial planning and control. Designed for non-accounting majors. Prerequisites: Senior or graduate standing.

Finance (FIN)

Personal Finance 3 hrs.
A review of the problems and techniques of family financial planning. Benefits and cautions of consumer credit, insurance, home ownership and personal investing relative to current economic and legal constraints.
301 Principles of Finance  
A study of finance in the operation and organization of business enterprises. The central focus reflects the present-day emphasis on decisions affecting the continuity and value of the firm. The student will be introduced to the various types and sources of business funds. Prerequisite: AC 211.

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

353 Public Finance  
Principles of taxation, government expenditures, borrowing, and fiscal administration. Prerequisite: EC 143. Same as EC 353 and PSC 353.

362 Security Analysis and Portfolio Management  
Approaches to investment strategy and decision. Valuation of securities and import of dividend policy and capital structure. An examination and study of the principles underlying security selections, timing and diversification to achieve optimum balance for various investment goals. Prerequisite: FIN 301.

375 Financial Institutions  
A study of the role and activities of financial intermediaries in the capital formation process. An examination of the capital markets in which these institutions operate. Prerequisite: FIN 301.

431 Managerial Finance and Policy Determination  
Advanced cases in financial management are used to analyze the function of the financial executive. The objective: develop an ability to analyze different types of managerial problems with the tools developed in earlier courses. Prerequisite: FIN 301.

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

Graduate and Undergraduate Credit

550 Seminar in Finance  
Extensive readings and reports reflecting current developments and trends in the area of financial theory and its applications to the decision-making process. The goal: develop a logical approach to financial problems which can be narrowed by the accepted techniques of financial analysis. Prerequisite: Senior or graduate standing. FIN 431, or permission of instructor.

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

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

#### 301 Principles of Management  
3 hrs.  
The elements of the managerial process that are fundamental to the successful operation of various types of enterprises.

#### 361 Organizational Behavior  
3 hrs.  
A behavioral science and social systems approach to the behavior of people at work in organizations. Behavioral decision-making, organization theory, the communication process, work motivation, groups, leadership, organizational climate, organizational development and other aspects of human behavior in organizations. Prerequisite: MGT 301.

#### 362 Management and Labor Relations  
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: MGT 301.

#### 363 Personnel: Human Resource Management  
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 301.

#### 385 Operations Management  
3 hrs.  
An introduction to the management of the production/operations function in business organizations. The course covers production systems design considerations, production planning, production control, inventory control, quality control, and maintenance and includes applicable quantitative methods. Prerequisites: MGT 301 and BUS 231.

#### 400 Management Science  
3 hrs.  
Applications of management science in business organizations. Topics include systems analysis, management information systems, and the use of quantitative models. Bayesian decision theory is developed and applied to the solution of practical business problems. Game theory and utility (preference) theory and their contributions are also explored. Prerequisites: BUS 231, MGT 301.

#### 405 Small Business Management  
3 hrs.  
Entrepreneurship and decision making in the small business enterprise. Emphasis is placed on identification and analysis of opportunities and operating problems. Prerequisite: MGT 301.

#### 430 Business and Society  
3 hrs.  
Identification of discussion of power influence in the American business system. A look at some of the problems which have developed historically as well as some of the difficulties present in today's business environment, and evaluate these in light of how they could have been avoided with proper recognition of responsibilities. Same as MKT 430. Prerequisites: MGT 301, MKT 301.

### Graduate and Undergraduate Credit

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

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

301 Principles of Marketing

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

3 hrs.

332 Consumer Behavior

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

3 hrs.

342 Promotional Strategy

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

3 hrs.

343 Market Research

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

3 hrs.

345 Market Channel Structure and Strategy

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

3 hrs.

410 Marketing Management

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

3 hrs.

414 Industrial Marketing

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

3 hrs.

415 Sales Management and Professional Salesmanship

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

3 hrs.

416 Retailing Policy and Management

The policies, practices and problem solutions in the efficient operation of both chain and independent retail stores. Includes the study of such problem areas as store location, organizational layout, merchandise planning and control, buying, pricing and promotion. Prerequisite: MKT 301.

3 hrs.
Business and Society 3 hrs.
Identification of discussion of power influence in the American business system. A look at some of the problems which have developed historically as well as some of the difficulties present in today's business environment, and evaluate these in light of how they could have been avoided with proper recognition of responsibilities. Same as MGT 430. Prerequisites: MKT 301, MGT 301.

Graduate and Undergraduate Credit

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

560 Seminar in Marketing 3 hrs.
Provides an opportunity for advanced students to examine and review selected classics in the literature and recent developments in marketing theory and application to marketing problem solving. Prerequisite: Senior or graduate standing or approval of instructor.

Communication and Linguistics

Professors: Welker (chairman), J. Wilson; Assistant Professor: C. Roach; Adjunct Assistant Professor: McCauley; Adjunct Instructor: Beach

Communication and Linguistics is an interdisciplinary program which offers a minor in Communication, with options in Speech/Theater Communication, Print Media (Journalism), and Electronic Media (Broadcast Journalism); and elective courses in Linguistics.

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

Communication Minor

A minor in communication should include a minimum of 21 semester hours of which at least 9 must be taken in courses numbered 300 or above. The minor incorporates a core of three courses (one each from the 100, 200, and 300 level courses), three additional courses from the desired option (journalism, broadcasting or speech-theatre), and the other course or courses from the remainder of the communication program or related disciplines.

The following courses are recommended for a Communication Minor.

Broadcasting Option
a. 9 hours of core courses (CM 130, 240, 310, or 330)
b. 9 hours of CM courses (3 courses from CM 131, 311, 340, or 430)
c. 3 hours of elective (1 elective)

Journalism Option
a. 9 hours of core courses (CM 130, 201, 310 or 330)
b. 9 hours of CM courses (3 courses from CM 131, 202, 301, and 311 or 430)
c. 3 hours of elective (1 elective)
**Speech-Theatre Option**

a. 9 hours of core courses (CM 130, 214, 310 or 330)

b. 9 hours of CM courses (3 courses from CM 110, 113, 121, 122, and 311)

c. 3 hours of elective (1 elective)

*Note: CM 110, 113, or 214 will satisfy requirements for teacher certification.*

**Linguistics Offerings**

Linguistics is the systematic study of language structure and usage for language systems in general. It includes such concerns as examination of the patterns of sounds, the grammatical structure, and the way patterns of meaning are communicated (the study of semantics), as well as language differences from region to region or among people of different background, profession, or personal style.

Linguistics course offerings do not constitute a minor. They may be taken as electives. The student should note that, in addition to the courses listed below, courses with linguistics content are offered in the departments of English, Modern Foreign Languages, Psychology, Computer Science, and the Developmental Learning Program.

**Communication (CM)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>110</td>
<td>Voice and Diction</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Study of language and speech production with attention to the development of individual vocal skills.</td>
<td></td>
</tr>
<tr>
<td>113</td>
<td>Basic Speech Communication</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Study and practice of the forms and methods of rhetorical communication.</td>
<td></td>
</tr>
<tr>
<td>121</td>
<td>Acting</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Emphasis on role-playing and fundamentals.</td>
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</tr>
<tr>
<td>122</td>
<td>Play Production</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Study and practice in the methods of producing a play.</td>
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</tr>
<tr>
<td></td>
<td>A survey of mass communication theory, the history of American mass media, and criticism of the contemporary forms and functions of the mass media of communication in the United States. (Same as SOC 130.)</td>
<td></td>
</tr>
<tr>
<td>131</td>
<td>Survey of Communication Techniques</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>This course deals with the technologies employed in print media, photography, radio, television and multi-media communications. It is intended to provide a basic understanding of the interrelationships and interdependencies of the various media techniques.</td>
<td></td>
</tr>
<tr>
<td>201</td>
<td>Journalism I</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>202</td>
<td>Journalism II</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Emphasis on reporting skills in the specialized areas of local government, police and the courts, and education. Prerequisite: CM 201 or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>214</td>
<td>Oral Interpretation</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Study and practice in the intellectual, artistic and communicative skills required to read</td>
<td></td>
</tr>
</tbody>
</table>
prose, poetry and drama aloud effectively for oneself, for small groups, or for public performances. Prerequisite: CM 110 or CM 113 is recommended or approval of instructor.

240 Broadcasting: The Industry and Function 3 hrs. This course explores the origins of the broadcast industry in this country, its development, management and relationship to other industries. Emphasis is placed on the business functions of commercial radio and television broadcasting including the effect of government regulations. Prerequisite: CM 130 or CM 131 or approval of instructor.

301 News Editing, Headlining and Layout 3 hrs. An intensive study of standard symbols and copy editing techniques, headline writing and unit counts, and techniques of cover layout and page design. Prerequisite: CM 201 and/or approval of instructor.

310 Persuasion: Theory, Research and Analysis 3 hrs. Study of the premises, theories and methods used in a variety of persuasion forms, including commercial advertisement, religious evangelism and non-profit solicitation. Relates speculative and experimental works to analysis of persuasive messages. Prerequisite: CM 113 or CM 130 is recommended or approval of instructor.

311 Interviewing: Theory and Technique 3 hrs. Study and practice in the theory and technique of several two-party communication forms, including employment interviewing, basic counseling and information-getting. Prerequisite: CM 113 and/or CM 350 are recommended or approval of instructor.

330 Communication Theory and Research 3 hrs. An intensive study of various theories, problems and research in the areas of interpersonal, nonverbal and mass communication, formulating a psychological conception of man as an information-gathering and information-processing system. Emphasis is placed on empirical findings of the modes, media and the effects of various communication forms. Prerequisite: PY 103 or approval of instructor. (Same as PY 330.)

340 TV Production and Direction 3 hrs. This course introduces the student to the fundamentals of TV production including the electronic equipment, TV cameras, optics, sound, lighting, staging and directoral techniques. It provides a basic experience in TV studio operations and program production. Prerequisite: CM 240 or approval of instructor.

430 Law of Mass Communication 3 hrs. Study of the evolution and current status of legal thought and doctrine concerning freedom of expression in speech, print, and broadcasting. Includes issues of obscenity, censorship, and the "fairness doctrine." Prerequisite: CM 130 is recommended or approval of instructor.

Linguistics (LI)

100 Language, Mind and Society 3 hrs. An introduction to some major language phenomena, including implications for the individual, as well as social and historical factors in language structure and change. Topics include language families of the world; regional and social differences in language use; language learning; and relationships to thought and culture.

101 Introduction to Linguistic Analysis 3 hrs. An introduction to technical and theoretical linguistics. Topics include phonology, morphology, historical linguistics, theories of grammar, syntax, and semantics. Practical work in analyzing language data and writing a grammar will conclude the course.
Criminal Justice

The University of Alabama in Huntsville has developed an undergraduate degree program that is designed to help meet critical needs in the criminal justice system for well-educated professionals to fill a variety of important positions. Although the program is sufficiently flexible to benefit persons throughout the system, an emphasis has been placed on needs in police functions. Law enforcement personnel today must constantly deal with problems resulting from population growth, increasing urbanization, developing technology, the civil rights revolution, and a breakdown of traditional values. They must be aware of these factors and must understand the political, psychological, and sociological implications for the community. They must deal with all citizens—rich and poor, young and old, of whatever cultural and ethnic backgrounds—in a manner which will maintain confidence and support. The UAH program is designed to provide these objectives through a law enforcement program with courses designed to provide criminal justice personnel with a general education.

The criminal justice program leads to a Bachelor of Arts degree. The Area of Concentration (AOC) in criminal justice involves a major in the social and behavioral sciences and a minor in law enforcement. PSC 101, SOC 100, and PY 103 are required foundation courses. An additional three semester hours in political science, sociology, or psychology should be taken to satisfy the social science requirement. All social science majors must take statistics. Excluding the six-hour social science requirement, the interdisciplinary major for criminal justice must include 36 hours of course work in the social and behavioral sciences chosen with the approval of the student’s advisor. Also, at least 15 semester hours in the major must be in courses numbered 300 or above. Requirements for the minor must be met with 21 semester hours in law enforcement (LE) courses of which 6 semester hours must be in courses numbered 300 or above. Of the 12 semester hours required for graduation, at least 39 semester hours of course work must be at the level of 300 or above.

A typical interdisciplinary major in criminal justice might include, aside from those listed above, a combination of courses chosen from the selection below. As several courses have specific prerequisites, great care must be exercised in program planning.

- PY 300: Experimental Psychology
- PY 311: Individual Difference
- PY 401: Personality
- PY 433: Abnormal Psychology
- SOC 305: Urban Sociology
- SOC 319: Deviance and Social Control
- SOC 320: Criminal Behavior
- SOC 330: Minority Groups
- SOC 385: Complex Organizations
- SOC 420: Sociology of Corrections and Rehabilitation
- SOC 490: Sociology of Poverty and Deprivation
- PSC 372: Civil Liberties
- PSC 410: Local Government and Metropolitan Problems
- PSC 472: American Judicial Process

Students interested in a degree in criminal justice should seek academic counseling from faculty advisors in the Departments of Political Science and Sociology. AOC’s will also be prepared in these departments. Due to the complexity of selecting courses which have prerequisites, it is strongly recommended that the AOC be completed during the sophomore year.

Courses in the law enforcement minor must be selected from courses listed below.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Introduction to Criminal Justice</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>An introductory survey of the panorama of the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>criminal justice system. Philosophical and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>historical background; constitutional</td>
<td></td>
</tr>
<tr>
<td></td>
<td>limitations; criminal justice agencies;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>pre-trial, trial, and post-trial processes;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>evaluation of criminal justice today.</td>
<td></td>
</tr>
<tr>
<td>102</td>
<td>Law Enforcement Operations</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>A study of the functions and relationships in</td>
<td></td>
</tr>
<tr>
<td></td>
<td>line elements of law enforcement agencies.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This course offered only through independent</td>
<td></td>
</tr>
<tr>
<td></td>
<td>study. (Note: Persons who have successfully</td>
<td></td>
</tr>
<tr>
<td></td>
<td>completed an approved police academy training</td>
<td></td>
</tr>
<tr>
<td></td>
<td>program, civil or military, may be granted</td>
<td></td>
</tr>
<tr>
<td></td>
<td>credit in this course for their educational</td>
<td></td>
</tr>
<tr>
<td></td>
<td>experience.)</td>
<td></td>
</tr>
<tr>
<td>201</td>
<td>Investigation and Evidence</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Introduction to the evidential aspects of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>criminal investigation. Rules of evidence;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>basic principles of investigation; nature and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>types of evidence; testimony; collecting and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>presenting evidence; judicial decisions.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prerequisite: LE 101 or permission of the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>coordinator.</td>
<td></td>
</tr>
<tr>
<td>203</td>
<td>Introduction to Criminalistics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Introductory survey of the scientific approach</td>
<td></td>
</tr>
<tr>
<td></td>
<td>to criminal investigation. Definition and scope</td>
<td></td>
</tr>
<tr>
<td></td>
<td>of criminalistics; physical evidence and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>probability; equipment for investigation;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>collecting physical evidence; nature of physical</td>
<td></td>
</tr>
<tr>
<td></td>
<td>evidence; laboratory operations and techniques;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the expert witness. Prerequisite: LE 101;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>introductory science desirable.</td>
<td></td>
</tr>
<tr>
<td>301</td>
<td>Crime and Delinquency</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>A detailed study of crime and delinquency in</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the United States: quantity, measurement,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>trends, economic impact, and victimization.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Examination of the nature and impact of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>organized crime. Prerequisite: LE 101 or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>permission of instructor.</td>
<td></td>
</tr>
<tr>
<td>303</td>
<td>Criminal Law</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>A study of substantive criminal law. Principles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>of criminal law; theories of legal defenses;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>crimes against the person and property; offenses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>against public morality and decency; offenses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>against the sovereign, public peace, and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>maintenance of order.</td>
<td></td>
</tr>
<tr>
<td>304</td>
<td>Criminal Procedure</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>A study of the procedure that controls the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>judicial process in criminal cases. Nature of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the criminal process; arrest, search, and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>seizure; interrogation and confessions; pre-trial</td>
<td></td>
</tr>
<tr>
<td></td>
<td>proceedings; order and conduct of trials;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>review of convictions; juvenile proceedings;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>military criminal proceedings; constitutional</td>
<td></td>
</tr>
<tr>
<td></td>
<td>rights. Prerequisite: LE 303 or equivalent.</td>
<td></td>
</tr>
<tr>
<td>305</td>
<td>Probation and Parole</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>An examination of procedures for the release of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>convicted law violators. Pre-sentence</td>
<td></td>
</tr>
<tr>
<td></td>
<td>investigations; the selection, supervision, and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>releasing of probationers and parolees; rules</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and regulations; trends in treatment;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>effectiveness of release procedures.</td>
<td></td>
</tr>
<tr>
<td>320</td>
<td>Criminal Behavior</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>An analysis of theories of criminal behavior</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and criminal control procedures. Emphasis is</td>
<td></td>
</tr>
<tr>
<td></td>
<td>placed on causation, criminal and chancery laws,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and crime control by police and criminal or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>juvenile courts. Prerequisite: SOC 100 and SOC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>102, or SOC 100 and approval of instructor.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Same as SOC 320.)</td>
<td></td>
</tr>
<tr>
<td>401</td>
<td>Critical Issues in Law Enforcement</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>An examination of current issues that are of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>critical importance to law enforcement in a free</td>
<td></td>
</tr>
<tr>
<td></td>
<td>society. Reading and discussion of articles and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>commission reports.</td>
<td></td>
</tr>
</tbody>
</table>
Economics

Associate Professors: Bond, Mirakhor (chairman); Assistant Professors: Wu, Sriver

Area of Concentration (AOC) with Economics Major

The Department of Economics requires that the student desiring an Area of Concentration (AOC) in economics must include in his program 21 semester hours of core courses (in addition to EC 142-143) which include the following: EC 231, 310, 340, 341, 345, 352, 448. In addition to these courses, the student can take an additional 15 hours of other courses offered in the Departments of Economics and/or Business in his area of interest.

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC 231</td>
<td>Applied Statistics for Social and Behavioral Sciences</td>
<td>3</td>
</tr>
<tr>
<td>EC 310</td>
<td>Introduction to the Use of Mathematics in Economics</td>
<td>3</td>
</tr>
<tr>
<td>EC 322</td>
<td>Public Policy Toward Business</td>
<td>3</td>
</tr>
<tr>
<td>EC 325</td>
<td>Intermediate Statistics</td>
<td>3</td>
</tr>
<tr>
<td>EC 340</td>
<td>Macro Economic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EC 431</td>
<td>History of American Economic Growth</td>
<td>3</td>
</tr>
<tr>
<td>EC 345</td>
<td>Micro Economic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EC 352</td>
<td>Money and Banking</td>
<td>3</td>
</tr>
<tr>
<td>EC 430</td>
<td>Advanced Economic and Business Statistics</td>
<td>3</td>
</tr>
<tr>
<td>EC 460</td>
<td>Problems in Economics</td>
<td>3</td>
</tr>
<tr>
<td>EC 448</td>
<td>Development of Economic Theory</td>
<td>3</td>
</tr>
<tr>
<td>EC 585</td>
<td>Comparative Economic Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

| Total       |                                                   | 36             |

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC 211</td>
<td>Principles of Accounting</td>
<td>3</td>
</tr>
<tr>
<td>MGT 301</td>
<td>Essentials of Management</td>
<td>3</td>
</tr>
<tr>
<td>EC 231</td>
<td>Applied Statistics for Social and Behavioral Sciences</td>
<td>3</td>
</tr>
<tr>
<td>EC 310</td>
<td>Introduction to the Use of Mathematics in Economics</td>
<td>3</td>
</tr>
<tr>
<td>EC 321</td>
<td>Engineering Economy</td>
<td>3</td>
</tr>
<tr>
<td>EC 322</td>
<td>Public Policy Toward Business</td>
<td>3</td>
</tr>
<tr>
<td>EC 325</td>
<td>Intermediate Statistics</td>
<td>3</td>
</tr>
<tr>
<td>EC 340</td>
<td>Macro Economic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EC 341</td>
<td>History of American Economic Growth</td>
<td>3</td>
</tr>
<tr>
<td>EC 345</td>
<td>Micro Economic Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>
EC 352 Money and Banking ................................................. 3
EC 430 Advanced Economic and Business Statistics .................. 3
EC 448 Development of Economic Theory ............................... 3

39

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

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

21

Economics Minor

A student whose area of interest is in a discipline other than economics, but wishing a minor 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 including 6 semester hours in courses numbered 300 or above, or (b) appropriate courses offered in economics as part of an area of cognate studies with other disciplines including a minimum of 12 semester hours, 6 of which must be in courses numbered 300 or above.

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

**With Mathematics**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC 142</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>EC 143</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>EC 231</td>
<td>Applied Statistics for Social and Behavioral Sciences</td>
<td>3</td>
</tr>
<tr>
<td>EC 352</td>
<td>Money and Banking</td>
<td>3</td>
</tr>
</tbody>
</table>

And any three of the following five courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC 340</td>
<td>Macro Economic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EC 341</td>
<td>History of American Economic Growth</td>
<td>3</td>
</tr>
<tr>
<td>EC 345</td>
<td>Micro Economic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EC 430</td>
<td>Advanced Economic and Business Statistics</td>
<td>3</td>
</tr>
<tr>
<td>EC 448</td>
<td>Development of Economic Theory</td>
<td>3</td>
</tr>
</tbody>
</table>

21

**With History or Political Science**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC 142</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>EC 143</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>EC 322</td>
<td>Public Policy Toward Business</td>
<td>3</td>
</tr>
<tr>
<td>EC 341</td>
<td>History of American Economic Growth</td>
<td>3</td>
</tr>
</tbody>
</table>

93
EC 344 European Economic History ........................................ 3
EC 353 Public Finance ......................................................... 3
EC 585 Comparative Economic Systems .................................... 3

With Psychology or Sociology
EC 142 Principles of Economics ............................................ 3
EC 143 Principles of Economics ............................................ 3
EC 322 Public Policy Toward Business ..................................... 3
EC 325 Intermediate Statistics ............................................. 3
EC 341 History of American Economic Growth .......................... 3
EC 430 Advanced Economic and Business Statistics .................... 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 application in investigating the economic functional relation between business, consumers, and government. Topics of concentration: national income analysis, determination of employment and price levels, and introduction to market demand and supply analysis. Prerequisite: MA 104 or 105 or equivalent is recommended.

143 Principles of Economics II ......................................... 3 hrs.
A continuation of EC 142. Concentrates on more advanced value theory and its application to analysis of market performance under conditions ranging from competitive to monopolistic, including consideration of distribution along functional lines, and economic growth. Prerequisite: EC 142.

Collection, classification, and presentation of data, measures of central tendency and dispersion, introduction to probability distribution and sampling theory, confidence limits and tests of significance, chi-square and "t" distribution. Prerequisite: MA 105, or college algebra or its equivalent, or the approval of the instructor. Same as BUS 231, PSC 231, PY 231 and SOC 231.

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

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

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

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

311 **Computer Applications in Economics and Business I** 3 hrs.
Business systems and data processing procedures; impact of data processing methods on the economic structure of business; user communication, file design, report control, documentation; data bases, information collection, planning and control, systems design concepts. 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.

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.
View of the impact of government on the operations of business firms: consumer product regulation, job safety regulation, environment, regulation of personnel practices, government procurement, and anti-trust regulation.

325 **Intermediate Economic and Business Statistics** 3 hrs.
Probability and probability distributions, sampling theory and statistical inference, analysis of variance, linear regression and correlation, analysis of time series, and index numbers and their construction. Prerequisite: EC 231 or its equivalent. Same as BUS 325.

340 **Macro Economic Analysis** 3 hrs.
Comprehensive study of the national economy as an economic system. Concentrates on the analysis of interdependent market processes in determining income, consumption, saving, investment, interest, employment, and the price level and economic growth as influenced by institutional structure, technological change, business management, and government monetary and fiscal policy. Involves study and application of economic accounting structure and method. Prerequisite: EC 143, EC 310 or approval of instructor.

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.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>353</td>
<td>Public Finance</td>
<td>3 hrs</td>
<td>Principles of taxation, government expenditures, borrowing, and fiscal administration. Prerequisite: EC 143. Same as FIN 353.</td>
</tr>
<tr>
<td>400</td>
<td>The Soviet Economy</td>
<td>3 hrs</td>
<td>Analysis of Soviet economic theory and strategy for economic growth; practice of economic planning, resource development and utilization, interpretation of economic performance, and comparison with China.</td>
</tr>
<tr>
<td>411</td>
<td>Computer Applications in Economics and Business II</td>
<td>3 hrs</td>
<td>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.</td>
</tr>
<tr>
<td>430</td>
<td>Advanced Economic and Business Statistics</td>
<td>3 hrs</td>
<td>Review of inferential statistics, statistical relationship of economic and business models (single-equation versus simultaneous-equation models), multiple regression techniques and their application to estimation of economic and business models. Prerequisite: EC 310, 325 or approval of instructor.</td>
</tr>
<tr>
<td>448</td>
<td>Development of Economic Theory</td>
<td>3 hrs</td>
<td>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.</td>
</tr>
<tr>
<td>452</td>
<td>State and Local Finance</td>
<td>3 hrs</td>
<td>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.</td>
</tr>
<tr>
<td>460</td>
<td>Problems in Economics</td>
<td>3 hrs</td>
<td>Special topics in the areas of student interest. Prerequisite: approval of instructor.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>510</td>
<td>Survey of Economic Theory</td>
<td>3 hrs</td>
<td>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 instructor.</td>
</tr>
<tr>
<td>546</td>
<td>International Economics and Trade</td>
<td>3 hrs</td>
<td>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.</td>
</tr>
<tr>
<td>564</td>
<td>Regional Economics</td>
<td>3 hrs</td>
<td>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: Senior standing, graduate student or approval of instructor.</td>
</tr>
<tr>
<td>585</td>
<td>Comparative Economic Systems</td>
<td>3 hrs</td>
<td>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.</td>
</tr>
</tbody>
</table>

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

610 Theory of Value and Distribution 3 hrs.
This course is a continuation of EC 345. Consideration of classical and neoclassical theory of value and distribution. Prerequisite: EC 345 or equivalent. EC 510 and the approval of the instructor for non-economics majors.

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

630 Evolution of Economic Thought 3 hrs.
Methodology and social philosophy of outstanding economists, and their part in shaping economic development. The treatment will be selective and will emphasize the systematic nature of theories involved. Prerequisite: EC 448, 600, 610 or equivalent.

640 Seminar in Economics 3 hrs.
Intensive analysis of selected theoretical and applied aspects of economics. Prerequisite: EC 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

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

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 requirements as set forth below. Students who choose to major in teacher education and qualify for teacher certification should contact the Chairman of the Department of Education for the assignment of an academic advisor upon admission. The student will also be required to counsel with an advisor from another appropriate field in order to coordinate planning of the program of study.

This section of the Catalog has been revised to reflect changes in requirements for teacher education and certification. Other sections of the Catalog which relate to teacher education and certification have not been revised due to printing deadlines. Therefore it is essential that programs be planned conjointly with requirements stated in this section overriding inconsistencies.

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. Transfer students who have completed two years of undergraduate study
must submit the application upon completion of nine semester hours of work. Applicants to the program should: (1) have a cumulative quality-point average of 1.20 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; (4) have satisfactory performance on a written and spoken English language competency examination; (5) have satisfactory interview(s) with representatives of the Department of Education; (6) have a minimum score of 16 on the ACT taken prior to entering college, or equivalent scores on another approved examination; students may elect to be re-examined. All students admitted to the program will have a teacher education advisor assigned to them.

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 1.20 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 should complete the State Department of Education certification application at the Office of Admissions and Records.

In order to be recommended for the teaching certificate, a student, in addition to fulfilling the general degree requirements, must satisfactorily complete the approved program with at least a 1.20 grade point average on all work attempted and at least a 1.20 grade point average on all work attempted in the teaching field or fields and in professional education.

Professional Elementary Education Curriculum (PEEC)

The curriculum in elementary education is planned to provide a broad liberal education base and an in-depth study of a single discipline to prepare the elementary teacher for the master teacher and team teaching role in the elementary and middle schools.

The scope of the PEEC makes it imperative that the student indicate as early as possible, 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 secondary area of study for the AOC.

A student's second area of study determines whether he is working toward a B.A. or a B.S. degree. Upon successful completion of the PEEC, the student is eligible for the Alabama Class B Elementary Professional Teachers Certificate.
### General Education Requirements

<table>
<thead>
<tr>
<th>Humanities &amp; Behavioral Sciences</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman Composition (EH 101-102 or 103-104)</td>
<td>6</td>
</tr>
<tr>
<td>Survey of English Literature (EH 205-206)</td>
<td>6</td>
</tr>
<tr>
<td>Speech (CM 110, 113 or 214)</td>
<td>3</td>
</tr>
<tr>
<td>Origins and Development of the Contemporary World (HY 101-102 or 391-392)</td>
<td>6</td>
</tr>
<tr>
<td>Art for the Elementary Teacher (ART 215)</td>
<td>3</td>
</tr>
<tr>
<td>Music for the Elementary Teacher (MU 215)</td>
<td>3</td>
</tr>
<tr>
<td>Physical Education for the Elementary Teacher (ED 215)</td>
<td>3</td>
</tr>
<tr>
<td>Modern Foreign Language (one language)</td>
<td>6-12</td>
</tr>
<tr>
<td>Economics, Political Science or Sociology (6 hours from one discipline)</td>
<td>6</td>
</tr>
<tr>
<td>(a minimum of 3 hours in a discipline other than history and the one chosen above)</td>
<td>6</td>
</tr>
<tr>
<td>Psychology (PY 103)</td>
<td>3</td>
</tr>
</tbody>
</table>

### Science-Mathematics

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

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

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

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

66-72

### Area of Concentration (AOC)

#### Major Area of Study: Elementary Education

| ED 230 Human Development                                                                       | 3              |
| ED 261 Foundations of Education                                                               | 3              |
| ED 263 Educational Psychology                                                                 | 3              |
| ED 300 Group Processes                                                                        | 1-3            |
| ED 360 Diagnostic and Prescriptive Teaching                                                   | 3              |
| ED 372 Teaching Social Studies (3)                                                            | 3              |
| ED 373 Teaching Science (3)                                                                   | 6              |
| ED 374 Teaching Math (3)                                                                       | 3              |
| ED 375 Teaching Reading                                                                       | 3              |
| ED 371 Teaching Elementary Language Arts (3) or                                               |                |
| ED 400 Literature/Child & Adolescent (3)                                                      | 3              |
| ED 491 Student Teaching                                                                       | 9              |

36

#### Second Area of Study: Subject Field

A student planning to teach in an elementary field must select an area of study from any academic departments offering a major and which is approved for certification by the
State Department of Education. Of the 18 hours required, 15 must be at the 300 level or above.

Free Electives ................................................................. 2-8

The number of elective hours possible is dependent upon the student's high school curriculum and the choices of subjects within the GER.

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

Professional Secondary Education Curriculum

The curriculum in secondary education is planned to provide a broad liberal education base with a major in a professional teaching field as well as a major in professional education to prepare the teacher for the emergent master teacher and team teaching roles in the junior and senior high schools. The student should apply for admission to the Teacher Education Program as early as is possible. He will be assigned an advisor who will aid in planning for certification.

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 (CM 110, 113 or 214)</td>
<td>3</td>
</tr>
<tr>
<td>Origins and Development of the Contemporary World (HY 101-102 or 391-392)</td>
<td>6</td>
</tr>
<tr>
<td>Modern Foreign Language (one language)</td>
<td>6-12</td>
</tr>
<tr>
<td>Economics, Political Science, or Sociology (6 hours from one discipline)</td>
<td>6</td>
</tr>
<tr>
<td>Psychology (PY 103)</td>
<td>3</td>
</tr>
</tbody>
</table>

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

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

57-67
Area of Concentration (AOC)

Major Area I: Professional Teaching Field

The student planning to teach in secondary school may select a major area of study from any academic department offering a major and which is approved for certification by the State Department of Education. Approved majors in the School of Humanities and Behavioral Sciences are Art, Economics, English, History, French, German, Music, Political Science, Psychology, and Sociology. Approved majors in the School of Science and Engineering are Biology, Chemistry, Mathematics, and Physics. Specific requirements for each major are cited in the appropriate section of the Catalog. The course requirement in most of the professional teaching field will not exceed 36 hours.

Major Area II: Professional Education Program

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED 261</td>
<td>Foundations of Education</td>
<td>3</td>
</tr>
<tr>
<td>ED 263</td>
<td>Educational Psychology</td>
<td>3</td>
</tr>
<tr>
<td>ED 388</td>
<td>Secondary Methods</td>
<td>3</td>
</tr>
<tr>
<td>ED 408</td>
<td>Teaching Reading in the Secondary School</td>
<td>3</td>
</tr>
<tr>
<td>ED 490</td>
<td>Principles and Processes in Teaching (Seminar)</td>
<td>3</td>
</tr>
<tr>
<td>ED 497</td>
<td>Student Teaching</td>
<td>9</td>
</tr>
</tbody>
</table>

Advised Electives (choose any two)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED 325</td>
<td>Sociology of Education</td>
<td>3</td>
</tr>
<tr>
<td>ED 360</td>
<td>Diagnostic and Prescriptive Teaching</td>
<td>3</td>
</tr>
<tr>
<td>ED 375</td>
<td>Teaching of Reading</td>
<td>3</td>
</tr>
<tr>
<td>ED 410</td>
<td>Foundations of Educational Evaluation</td>
<td>3</td>
</tr>
<tr>
<td>ED 500</td>
<td>Special Problems in Education</td>
<td>3</td>
</tr>
<tr>
<td>ED 549</td>
<td>Educational Media</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

<table>
<thead>
<tr>
<th>Hours</th>
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<tbody>
<tr>
<td>5</td>
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</table>

Total

<table>
<thead>
<tr>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>128*</td>
</tr>
</tbody>
</table>

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

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

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

Education (ED)

111 Career Exploration

1 hr.

Educational and vocational planning. Prerequisite: 9 hours college credit and placement tests.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<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</td>
<td></td>
</tr>
<tr>
<td></td>
<td>relation to prospective teachers.</td>
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</tr>
<tr>
<td></td>
<td>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</td>
<td></td>
</tr>
<tr>
<td></td>
<td>of the learner, the learning process, and the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>learning situation. Prerequisite: PY 103 and</td>
<td></td>
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<tr>
<td></td>
<td>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</td>
<td></td>
</tr>
<tr>
<td></td>
<td>as a social institution, its structure, function</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and role in contemporary life. Prerequisite:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SOC 100 or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Same as SOC 325.</td>
<td></td>
</tr>
<tr>
<td>326</td>
<td>Teaching General Music in Elementary Schools</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Materials and methods. Emphasis on developing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>teaching competencies. Prerequisites: MU</td>
<td></td>
</tr>
<tr>
<td></td>
<td>103, 110, or permission of instructor. (Students</td>
<td></td>
</tr>
<tr>
<td></td>
<td>in teacher certification program should utilize</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ED prefix.) Same as MU 326.</td>
<td></td>
</tr>
<tr>
<td>327</td>
<td>Teaching General Music in Secondary Schools</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Materials and methods. Emphasis on developing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>teaching competencies. Prerequisite: MU 103,</td>
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<tr>
<td></td>
<td>110 or permission of instructor. (Students in</td>
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<tr>
<td></td>
<td>teacher certification program should utilize ED</td>
<td></td>
</tr>
<tr>
<td></td>
<td>prefix.) Same as MU 327.</td>
<td></td>
</tr>
<tr>
<td>410</td>
<td>Foundations of Educational Evaluation</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>This course will provide the prospective teacher</td>
<td></td>
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<tr>
<td></td>
<td>with an in-depth look at the measurement process</td>
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<tr>
<td></td>
<td>with a special emphasis on its relation to the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>problems of educational evaluation. Evaluation</td>
<td></td>
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<tr>
<td></td>
<td>will be presented as an integral part of overall</td>
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<tr>
<td></td>
<td>educational planning in addition to its use in</td>
<td></td>
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<tr>
<td></td>
<td>the measurement and evaluation of academic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>achievements.</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</td>
<td></td>
</tr>
<tr>
<td></td>
<td>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</td>
<td></td>
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<tr>
<td></td>
<td>maladjustments, the criteria for referral and</td>
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<td></td>
<td>classroom practices supporting good mental</td>
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<tr>
<td></td>
<td>health. Prerequisite: ED 263 or equivalent and</td>
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</tr>
<tr>
<td></td>
<td>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</td>
<td></td>
</tr>
<tr>
<td></td>
<td>evaluation instruments.</td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>Special Problems in Education</td>
<td>1-3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Independent study, special projects, and special</td>
<td></td>
</tr>
<tr>
<td></td>
<td>in-service programs. Prerequisite: senior</td>
<td></td>
</tr>
<tr>
<td></td>
<td>standing.</td>
<td></td>
</tr>
<tr>
<td>502</td>
<td>Environmental Education</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>The general nature of ecological life systems;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>relationships of humankind and environment;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>major conservation problems facing the world</td>
<td></td>
</tr>
<tr>
<td></td>
<td>today; exploration of alternate solutions; the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>tasks for educators.</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,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>use, and maintenance of audio-visual materials</td>
<td></td>
</tr>
<tr>
<td></td>
<td>in educational programs.</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</td>
<td></td>
</tr>
<tr>
<td></td>
<td>alignment, developmental exercises and movement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>exploration activities for physical education in</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the elementary grades.</td>
<td></td>
</tr>
</tbody>
</table>
Additionally there will be study of student needs to provide proper equipment, facilities, and leadership for the overall program.

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

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

300 Group Processes 1-3 hrs.
An examination of the major principles of group dynamics and their effective use in education. Informal group counseling experiences to help the student gain a better understanding of self and others are an integral part of the course methodology. (Enrollment for less than 3 hours credit only with permission of instructor.)

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 strengths and remediate weaknesses. Both group and individual processes are explored. Prerequisite: ED 263, junior standing, and admission to teacher education program.

Note: ED 371 thru 374 include a minimum of 16 hours laboratory experience in local elementary schools.

371 Language Arts 3 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 to the appropriate level. Prerequisite: ED 360.

372 Teaching the Social Studies 3 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 3 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 3 hrs.
The examination, design, and evaluation of experiences for teaching mathematics in elementary school. Modern trends in mathematics education. Prerequisite: ED 360.

375 Teaching of Reading 3 hrs.
Materials and methods in the teaching of reading, with emphasis on skill and development, both developmental and remedial techniques, and planning of reading programs.

400 Literature for Children and Adolescents 3 hrs.
This course will illustrate the relationship between developmental stages and the literature that young people find relevant at various stages of growth, and will develop an understanding and appreciation of the interdependence of experience and literature. Knowledge of the literature and critical assessment will be stressed, with emphasis on the use of library resources in the teaching of reading. Prerequisites: None.

491 Student Teaching in the Elementary School 9 hrs.
Teaching experience in local elementary schools under supervision. Concurrent conferences to be arranged as needed. Prerequisites: ED 230, 261, 263, 300, 360; two methods courses, or equivalent approved courses, plus an approved application for student teaching.
492 Observation and Participation in Teaching 3-6 hrs.
Selected observation and participation in elementary schools. For students in curricula
designed for both elementary and secondary schools and for experienced teachers.
Prerequisites: ED 230, 261, 263, 300, 360, two methods courses, or equivalent approved
courses, plus an approved application for student teaching.

Secondary Education

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

408 Teaching Reading in the Secondary School 3 hrs.
This course will provide the prospective teacher with knowledge of certain basic
developmental and remedial reading skills, practices, and concepts. It will extend those
learned in previous, more fundamental reading courses and will show the student how to
apply those fundamental skills and knowledge to the regular high school classrooms. This
will include adapting fundamentals of reading instruction to the various subject-matter areas
(i.e., the sciences, social studies, English, etc.). Also included will be a survey of special
reading programs such as Remedial Reading and reading instruction as practiced in Special
Education. Prerequisites: Junior standing and ED 375.

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

497 Secondary Student Teaching 9 hrs.
(Major area of teaching to be designated.) Observation and student teaching in secondary
schools. Prerequisites: ED 263, 388, and approved application for student teaching.

498 Observation and Participation in Teaching 3-6 hrs.
Selected observation and participation in secondary schools. For students in curricula
designed for both secondary and elementary and for experienced teachers. Prerequisites: ED
263, 388, and approved application for student teaching.

Special Education

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

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

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

Librarianship

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

380 Library Operation and Management 3 hrs.
Methods of organizing books and other library materials; includes ordering, processing,
circulating, mending, binding, inventory, budgeting, business records, housing, and
equipment.
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.

Selection of Materials 3 hrs.
Principles, policies, practices and problems in the selection of books and other materials and of techniques in the promotion of their use.

Books for Young People 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 pp. 106-07. Options available under this degree include learning disabilities. This option leads toward Alabama Class A Certification in special education.

Master's degree programs in the School of Humanities and Behavioral Sciences leading toward Alabama Class A Secondary Certification are found in the Departments of English and History and in programs in Developmental Learning and Administrative Science. Programs in the School of Science and Engineering leading toward Alabama Class A Secondary Certification are found in the Departments of Biology, Chemistry, Mathematics, and Physics. The graduate program in biology is a joint UAH/Alabama A&M degree offering and care should be taken to consult with the advisors in the Biology Department regarding special requirements. The appropriate catalog sections for each department should be consulted for details.

Note: Eligibility for Class B Certification is a State Department of Education prerequisite for issuance of the Class A Certificate.

To be admitted to graduate study in Education, a student must meet the general education requirements for admission to Graduate School.

Special Problems in Education 1-3 hrs.
Independent study, special projects, and in-service programs.

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

The Principal as Educational Leader 3 hrs.
The role of the principal as supervisor, organizer, and administrator of schools, program of studies, teaching staff, pupil personnel, plant and equipment, and community relationships.

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.

Contributions of Psychology to Education 3 hrs.
Principles, theory, and practice of psychology for teaching and administrative service in educational institutions. Focuses on the factors that determine learning, the conditions of effective teaching, the administrator and supervisor as the organizer of the milieu wherein teaching, learning and growth occur.
606 Principles of Curriculum Development 3 hrs.
Principles of curriculum construction which underlie the reorganization of the program of studies for elementary and secondary schools; origin and background of the curriculum; methods of organization; curriculum planning and development; and pertinent applications.

608 The Educational Leader as Evaluator 3 hrs.
Procedures and techniques of empirical evaluation including a sampling of available instruments; and research approaches complementary to the course AS 627 (Quantitative Methods in Management). Will specifically look at evaluation of teacher and staff performance; curricula; achievement and ability; media and equipment; and plant and facilities. A view toward preparation for accountability will be maintained.

609 Fundamentals of Reading for Middle and Secondary Schools 3 hrs.
Course includes instruction in developmental reading skills and methods and materials in reading; motivation of children and adolescents in reading; functional reading in the content areas; reading and the atypical learner: diagnosis and remediation of related deficiencies; and other related topics for the regular and special education teacher. Same as DL 609.

610 Legal Aspects of Public School Administration 3 hrs.
Legal status of schools in the United States, emphasizes Alabama conditions, school laws, constitutional provisions, judicial decisions, Attorney General's rulings, and regulations of the State Board of Education.

611 Principles of Guidance 3 hrs.
Sociological, psychological, and educational foundations of guidance; history and growth of the guidance movement; functions, scope, organization, and administration of guidance.

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

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

647, 648, 649 Field Experience/Practicum 1 hr. each
The student will demonstrate performance competencies in school administration through a field practicum. Students with committee approval may register for 647-648-649 individually or jointly. Such course approval will be based upon the committee's evaluation of the student's readiness to take part in the field practicum. Courses will be individually scheduled to fit concurrently with the student's regular employment assignment.

Developmental Learning

A Master's Degree Program

Professor: Wharry; Associate Professor: Kilgo; Assistant Professors: Butts, (chairman), Hays, James, Kirkpatrick, Stewart.

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

It is general enough to provide the student with 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 a master's degree requires a 6 credit-hour core curriculum, DL 610 and DL 630 (plus DL 593 if certification is desired) as well as at least 15 credit hours in a specialization and 3 or more hours in selected minor areas. The candidates for this degree must also select plan I or plan II of the graduate school. A candidate for the degree will have completed a total of no less than thirty hours. Professional specializations which are offered are listed following the course descriptions.

The developmental learning program will provide for an Alabama Class A Special Education Professional Certificate with endorsement in learning disabilities. A prerequisite to the Class A certificate is eligibility for a Class B Professional Certificate. To be admitted to the graduate program in developmental learning, a student must meet the general requirements for admission to Graduate School.

### Developmental Learning (DL)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<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. Same as ED 593.</td>
<td></td>
</tr>
<tr>
<td>600</td>
<td>Special Problems in Developmental Learning</td>
<td>1-3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Independent study, special projects and in-service programs.</td>
<td></td>
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<tr>
<td>601</td>
<td>Early Childhood Development</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Provides an in-depth study of physical, psychological, and social growth and development and maturation in early childhood. Will give particular attention to the perceptual, cognitive, and psychomotor processes that more directly affect learning and behavior. A look at normal development will precede and provide a basis for an analysis of the atypical. Includes observation practicum.</td>
<td></td>
</tr>
<tr>
<td>602</td>
<td>Psychopathology of Children With Learning Problems</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>A comprehensive study of symptoms and learning theory as related to children with learning problems. Includes observation and participation practicum.</td>
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<tr>
<td>603</td>
<td>Sensory-Motor Readiness in Children</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Provides an understanding of the necessary early learning process in children from birth to six years of age. The student is presented with techniques and sequential approaches to sensory-motor training on a developmental basis. Includes participation practicum.</td>
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<tr>
<td>604</td>
<td>Adaptive Academics</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Provides students with a sequential and veridical approach to making sensory-motor adaptations in academic areas so that programs can be developed to serve individuals who can best learn through adaptive and concrete procedures of a sensory-motor nature. Includes participation practicum.</td>
<td></td>
</tr>
<tr>
<td>605</td>
<td>Curriculum For Early Childhood Education</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>The study of structuring environments for optimum developmental learning. Curriculum models will be surveyed. Includes observation practicum.</td>
<td></td>
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<tr>
<td>606</td>
<td>Language Development</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>The study of stages of language development and techniques for stimulating language development and communication skills in the young child. Includes practicum.</td>
<td></td>
</tr>
<tr>
<td>609</td>
<td>Fundamentals of Reading for Middle and Secondary Schools</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Course includes instruction in developmental reading skills and methods and materials in reading; motivation of children and adolescents in reading; functional reading in the content areas; reading and the atypical learner; diagnostics and remediation of related deficiencies; and other related topics for the regular and special education teacher. Same as ED 609.</td>
<td></td>
</tr>
</tbody>
</table>
Interdisciplinary Aspects of Intervention
A seminar surveying the psychological and sociological aspects of learning. A multidisciplinary 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.

Diagnostic Procedures: Advanced Psychometrics
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.

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

Diagnostic Procedures: Selected Test For School-Age Children
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.

Human Learning Theory
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. Interrelationships between these behavioral changes and areas such as motivation, perception, personality and neurophysiology will also be considered. Examples of the applications of learning principles of the learning problems of children and adults will be studied.

Behavior Modification
Presents the basic psychological principles concerning the control of human behavior and reviews current theoretical experimental research in the field of behavior modification.

Statistics and Methodology
Research Methodology will include an overview of experimentation, simple data presentation normal probability vs. non-normal distributions, correlation, and reliability and validity. Will examine both the concept and actual work-type situations. Prerequisite: PY 231.

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

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

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

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

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

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

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

Program Alternatives

Learning Disabilities for a Teacher (Plan 1—Leads to Class A Certification)
Core: DL 593, 610, 630
Professional Specialization: DL 602, 603, 604, 606, 625 or 626, 627, 650

Learning Disabilities for a Teacher (Plan 2—Leads to Class A Certification)
Core: DL 593, 610, 630
Professional Specialization: DL 602, 604, 606, 625, 626, 627, 650

Early Childhood Learning
Core: DL 610, 630
Professional Specialization: DL 601, 605, 606, 640, 650. Thesis or Minor

Early Childhood for Handicapped
Core: DL 610, 630
Professional Specialization: DL 593, 601, 605, 606, 650. Thesis or Minor

Psychometrics for School or Clinical Diagnostician (Leads to Licensing)
Core: DL 610, 630
Professional Specialization: DL 625, 626, 627, 631, 650. Thesis or Minor

Developmental Processes
Core: DL 610, 630
Professional Specialization: DL 601, 602, 606, 628, 629, plus one diagnostics course Thesis or DL 603 and an additional diagnostics course

Available Minors

Learning Theory: DL 628, 629
Diagnostic Procedures: Two of the following DL 625, 626, 627, 631
Learning Disabilities: DL 602, 603
Child Development: DL 601, 640

Students should seek counseling upon entry into the program and will be expected to select an advisor early in their course of studies. A plan of study must be submitted prior to the completion of fifteen graduate hours.
English

Professors: Francis, Hutchens, Martin, Welker (chairman), Woodard; Associate Professor: Munson; Assistant Professors: Conover, Dillard, Harrison, Moore, Van Durmen; Instructors: Allen, Walker.

English Major

The requirements for a major are 24-33 semester hours of upper-division courses in addition to the 12 hours of general education requirements in English composition and literature, distributed as follows:

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shakespeare (EH 360)</td>
<td></td>
</tr>
<tr>
<td>American literature (EH 330, 331, 430, 431, 432/532, 433/533)</td>
<td>3</td>
</tr>
<tr>
<td>Literature before 1800</td>
<td>6</td>
</tr>
<tr>
<td>Literature after 1800</td>
<td>6</td>
</tr>
<tr>
<td>Electives</td>
<td>6-15</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>24-33</strong></td>
</tr>
</tbody>
</table>

One course in the novel is required; additional novel courses must be counted as English electives. Six semester hours must be taken in courses numbered 400 or above. Transfer students majoring in English must take at least 12 semester hours of upper division English courses (numbered 300 or above) at UAH. No more than 3 semester hours' credit in creative writing may be applied to an English major or minor without special approval, and no more than three hours of American literature may count as literature after 1800. Any course deemed appropriate by the advisor may be incorporated into the AOC. The Department recommends that the required hours in literature before 1800 and in literature after 1800 be distributed among the following groups:

I. Middle Ages and Renaissance (for example EH 450/550, 471/571)
II. Restoration and 18th Century (for example EH 380, 381, 470, 492)
III. 19th Century (for example EH 390, 391, 493)
IV. Modern (for example EH 420, 421, 431, 432/532, 500, 433/533, 494/594)

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 minor drawn from one discipline which includes a minimum of 21 semester hours, 6 hours of which must be numbered 300 or above; (2) A major from another discipline; (3) An area of cognate studies drawn from two or more disciplines which include a minimum of 21 semester hours, of which 9 hours must be in courses numbered 300 or above.

Near the end of the sophomore year, the English major should choose an advisor for help in planning an AOC as early as possible.

English Minor

A minor in English should include a minimum of 21 semester hours of which at least 3 must be taken in courses numbered 400 or above, identified as follows:
Basic Courses (general education requirements in composition and literature) .......... 12
Shakespeare (EH 360) .................................................................................. 3
One course chosen from Groups I, II, or III as listed in requirements
for English major .......................................................................................... 3
Electives in English ........................................................................................ 3

A student with a minor in English must take at least 6 semester hours of advanced
English courses (numbered 300 or above) at UAH.

Graduate Program

The English graduate faculty offers courses in English and American literature to
satisfy the requirements for the M.A. degree in English. In addition to the Graduate
School requirements, the requirements for the Master of Arts in English are:
1. 18 semester hours of graduate work in English, 6 hours of which may be transferred
credit approved by the department Graduate Committee.
2. 6 additional semester hours of elective graduate courses in English or a related
subject approved by the Graduate Committee.
3. At least 50% of the hours offered for the degree (exclusive of thesis credit hours) in
courses numbered 600 or above, and at least 9 hours in English courses at UAH numbered
600 or above (exclusive of thesis credit hours).
4. Master's thesis, required for a minimum of 2 terms. Upon petition to and approval
by the departmental Graduate Committee, a student may substitute nine hours of
graduate English courses for the thesis.
5. A minimum of 30 hours for a student attending full-time for three or more terms;
otherwise, 33 hours. A maximum of 9 hours per term will be permitted.
6. Reading knowledge of French, German, or Spanish.
7. Oral comprehensive examination on courses taken and on thesis. For students who
do not write a thesis, both oral and written examinations are required.

The requirements for the Master of Arts degree for those students seeking Class A
certification are the same as above, with the following exceptions:
1. Nine hours of graduate Education courses designated by the Education
Department may be substituted for the thesis.
2. A minimum of 33 hours is required: 24 hours in English, 9 in Education.
3. The student must hold Class B certification.
4. Both oral and written comprehensive examinations are required for those who do
not write a thesis.

Applicants for graduate study in English must present a satisfactory undergraduate
scholastic record and satisfactory Graduate Record Examination (GRE) scores in both
the aptitude and English portion of the examination. Each applicant must:
a. Have a minimum overall undergraduate quality point average of at least 2.0
(A=3.0), or at least 2.0 for the last 60 hours of work, and
b. Score at least 1,000 on the aptitude portion of the GRE, and
c. Have an undergraduate major in English or its equivalent as determined by the
departmental Graduate Committee.

An applicant whose scholastic record does not fully meet the requirements for
admission may be admitted provisionally. See section on School of Graduate Studies in
this catalog.
English (EH)

003 Remedial Writing
   No credit
   Required of students whose placement test score or class performance indicates the need of remedial work.

101 Freshman Composition
   3 hrs.
   Emphasis on theme writing, including at least one documented paper related to close critical reading of short stories and the novel. Prerequisite: placement.

102 Freshman Composition
   3 hrs.
   Emphasis on theme writing, including at least one documented paper related to close critical reading of poetry and drama. Prerequisite: EH 101.

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, with exceptions as indicated.

205 Survey of English Literature
   3 hrs.
   Anglo-Saxon literature through Milton.

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

207 Modern English Grammar
   3 hrs.
   Review of traditional and structural grammar; introduction to transformational syntax.

210 Fiction Writing
   3 hrs.
   Practice in writing of fiction, from conception to revision. Prerequisite: EH 206 and approval of instructor.

230 Survey of American Literature
   3 hrs.
   Survey of writers, genres, and periods from the Puritans to the present day. Prerequisites: EH 101 and EH 102 or equivalent.

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

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 deities and myths.

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

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.
340 Special Topics in Literature 3 hrs.
Study of a theme, writer, or historical movement, to be announced in advance. Prerequisite: Completion of GER in Literature.

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.

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

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

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

407 English Linguistics 3 hrs.
Advanced survey of the linguistic analysis of contemporary English. Major topics include transformational analysis of English grammar, an introduction to English dialect studies, socio- and psycho-linguistic aspects of spoken and written English, and linguistic analysis of prose style. Prerequisite: Junior-Senior standing.

408 History of the English Language 3 hrs.
A diachronic study of the English language from the pre-Anglo-Saxon period to the modern English period. Analysis of the phonological, morphological, syntactic, and semantic changes which have taken place in the language. Consideration will also be given to the historical events which have influenced and effected changes in the language. Prerequisite: Junior-Senior standing.

411 Library Research 1 hr.
Introduction to enumerative, descriptive, analytical, and textual bibliography as well as research methods, tools, and terminology used in literary research. Prerequisite: Junior-Senior standing.

420 Modern Poetry 3 hrs.
Major movements in American and British poetry of the 20th century. Prerequisite: Junior-Senior standing.

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

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

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

432 The Southern Renaissance 3 hrs.
Origin and development of Southern myth with particular emphasis on major writers of the Southern Renaissance. Prerequisite: Junior-Senior standing.

433 William Faulkner 3 hrs.
Critical study of the works of Faulkner, concentrating on his major phase, 1929-42; biography and backgrounds.
Chaucer
*The Canterbury Tales* and other major works studied in relation to English and European literary and philosophical traditions. In Middle English. Prerequisite: Junior-Senior standing.

Renaissance Non-Dramatic Poetry
Renaissance poetry. Wyatt through Donne.

Milton and the 17th Century
Milton's minor poems, selected prose, and *Paradise Lost*, studied with reference to the 17th-century context.

English Drama
From the beginnings to 1642, exclusive of Shakespeare. Prerequisite: Junior-Senior standing.

The English Novel
Defoe to Jane Austen: Critical reading of representative novels, accompanied by historical study of the emergence of the genre.

The English Novel
Dickens through Hardy: Critical reading of representative novels, accompanied by historical survey of major trends.

Studies in the Twentieth-Century Novel
A concentration on major novelists writing in English, with representative emphasis on their world contemporaries, as they attempt to depict reality in response to the demands of the post-Darwinian world. Prerequisite: Junior-Senior standing.

Literary Criticism
Major theories and methods, with application by student. Prerequisite: Senior standing.

Special Studies in American Literature
Intensive study of one or more writers, groups, or movements, announced in advance. Prerequisite: Junior-Senior standing.

Special Studies in English Literature
Intensive study of one or more writers, groups, or movements, announced in advance. Prerequisite: Junior-Senior standing.

Courses listed below are available to graduate students. Those numbered 500 to 594 have the same basic content as their undergraduate (400 level) counterpart, with the exception that the graduate student will be given additional assignments and attention appropriate to a graduate level of study. Courses numbered 600 or above are open only to graduate students.

Literary Criticism

English Linguistics

History of the English Language

Library Research

Modern Poetry
Major movements in British and American poetry of the twentieth century. Selected readings in the more important criticism.

Special Studies in American Literature

Southern Renaissance
533 William Faulkner 3 hrs.
540 Special Studies in English Literature 3 hrs.
550 Chaucer 3 hrs.
571 English Drama to 1642 3 hrs.
601 The Idea of the Tragic 3 hrs.
A close study of elements which figure in tragic theory common to tragedy as a theater form and to the tragic as it is reflected in the modern novel.
602 Theory of the Novel 3 hrs.
A seminar considering the current debate against the background of earlier theory and practice.
630 Studies in American Literature to 1865 3 hrs.
Consideration of major movements from Colonial times to 1865; selected major figures or special problems will be considered in depth (topics may vary).
631 American Literature from 1865 to the Present 3 hrs.
Consideration of change and development in terms of genre, theme, and major figures. Emphasis may vary.
651 Studies in Medieval Literature 3 hrs.
Materials from the literature of medieval England, excluding Chaucer, in their cultural context, selected from the following: the Gawain poet, *Piers Plowman*, the short poem, drama, romance, Malory.
652 Selected Studies in Anglo-Saxon Literature 3 hrs.
Offered upon demand.
660 Seminar in Shakespeare 3 hrs.
Emphasis on the "problem" plays and less celebrated tragedies and history plays, with special attention to the major criticism and special problems of interpretation and the Elizabethan background.
670 Milton 3 hrs.
A study of *Paradise Lost*, *Paradise Regained*, and *Samson Agonistes* in the light of Milton’s exposition of his thought in *De Doctrina Christiana*, *of Education*, other prose works and the early poems. These ideas will be considered both in seventeenth-century terms and in terms of modern thought.
680 Eighteenth-Century Studies 3 hrs.
A seminar on the literary life of the century, with participation by faculty members of other departments.
690 Studies in English Romanticism 3 hrs.
Seminar. An examination of selected poetry and critical prose, with particular attention to aesthetic theory and the philosophical and psychological backgrounds.
691 Studies in the Victorian Period 3 hrs.
Seminar. A study of representative writing, both poetry and prose, with particular emphasis on social and cultural changes which inform the literature.
699 Master’s Thesis 3 hrs.
Required each term a student is working and receiving direction on his master’s thesis. A minimum of two terms is required, and no more than 6 hours’ credit is allowed for the thesis.
Health, Physical Education and Recreation

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

Health, Physical Education and Recreation (HPE)

101  Physical Fitness  1 hr.
102  Beginning Tennis. Lab Fee: Level 1.  1 hr.
103  Beginning Golf. Lab Fee: Level 1.  1 hr.
104  Basketball. Lab Fee: Level 1.  1 hr.
105  Volleyball. Lab Fee: Level 1.  1 hr.
106  Softball. Lab Fee: Level 1.  1 hr.
107  Folk and Square Dance  1 hr.
108  Soccer & Speedball. Lab Fee: Level 1.  1 hr.
109  Bowling. Lab Fee: 50c per class.  1 hr.
110  Ice Skating. Lab Fee: Level 4.  1 hr.
112  Beginning Swimming. Lab Fee: Level 3.  1 hr.
113  Intermediate Swimming. Lab Fee: Level 3.  1 hr.
118  Beginning Self Defense  1 hr.
140  Varsity Sports—Basketball  1 hr.
141  Varsity Sports—Soccer  1 hr.
150  Contemporary Medicine and the Young Adult  3 hrs.
This course acquaints the student with the contemporary health system in the U.S., its various components, and their functional relationships to each other. Serves as a description of common individual health problems of special significance to young adults, how these health problems are manifested clinically and what constitutes appropriate management.

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

History

Professor: Roberts, White (chairman); Associate Professor: Hull, Salley, Shields; Assistant Professors: Boucher, Pearson, Williams; Adjunct Associate Professor: Barnard; Adjunct Assistant Professor: Kitchens.

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 minor 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 minor 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. An area of cognate studies 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 Minors

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

Graduate Program

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

1. 18 semester hours of graduate work in history, 6 of which may be transfer credit approved by the Graduate Committee. Twelve hours in American History is required; HY 605 is required.

117
2. 6 additional hours of elective graduate courses in history or a related subject approved by the Graduate Committee.

3. At least 50% of the hours required for a graduate degree (exclusive of thesis credit hours) must be in courses numbered 600 or above, and at least 9 hours must be in history courses at The University of Alabama in Huntsville numbered 600 or above (exclusive of thesis credit hours).


5. If a student is full time for three or more terms, a minimum of 30 hours is required; otherwise, 33 hours is required and the additional hours must be in history courses. A maximum of 9 hours per term will be allowed.

6. Oral comprehensive examination on courses taken and on thesis. Competency must be demonstrated in at least two fields of history.

7. All University-wide requirements not specifically designated in the above requirements must be met.

The requirements for the Master of Arts degree for those students seeking Class A certification are the same as above with the following exceptions:

1. Nine hours of graduate courses in Education may be substituted for the elective graduate courses in history or a related subject.

2. Additional graduate hours in a related subject other than education may be allowed in lieu of thesis.

3. The student must hold Class B certification.

4. Both oral and written comprehensive examinations are required for those who do not write a thesis.

Applicants for graduate study in history must present a satisfactory undergraduate scholastic record and satisfactory Graduate Record Examination (GRE) scores in both the aptitude and advanced portion of the examination. Reading knowledge of French, German or Spanish is required. Admission may be granted without this requirement, but the student must demonstrate reading proficiency in one of the above languages before the degree will be granted. Proficiency will be determined by the Department of History in cooperation with the Department of Modern Foreign Languages.

Each applicant must: (a) have a minimum overall undergraduate quality point average of at least 2.0 (A=3.0), or at least 2.0 for the last 60 hours of work, and (b) score at least 1,000 on the aptitude portion of the GRE, and (c) have an undergraduate major in history or its equivalent as determined by the Departmental Graduate Committee.

**History (HY)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Origins and Development of the Contemporary World, Part I</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>T (Tutorial)</td>
<td>A general survey of the major western civilizations to 1500. Not open to seniors.</td>
<td></td>
</tr>
<tr>
<td>101</td>
<td>Origins and Development of the Contemporary World, Part I</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>102</td>
<td>Origins and Development of the Contemporary World, Part II</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>A general survey of the major Western Civilizations since 1500. Not open to seniors.</td>
<td></td>
</tr>
</tbody>
</table>
Origins and Development of the Contemporary World, Part II (Tutorial) 3 hrs.
Similar to HY 102. Students are held responsible for the full work of the course, but emphasis is given to developing the basic skills of historical study. Permission of history faculty required.

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

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).

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).

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.

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.

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.

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.

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.

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

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

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.

English Constitutional History Since 1603 3 hrs.
A continuation of HY 247. Additional studies 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.
Current World History
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.

Contemporary Latin America
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.

Modern France
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.

Modern Germany
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.

History of Italy Since the Renaissance
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.

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

The Negro in Twentieth Century America
A study of the interrelationship of the Negro and the industrial-urban environment of the United States.

Social and Cultural History of the United States to 1865
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.

Social and Cultural History of the United States Since 1865
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.

Foreign Relations of the United States to 1890
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.

Foreign Relations of the United States Since 1890
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.

Imperial Russia
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.
Twentieth-Century Russia
The last years of Imperial rule, the constitutional experiment, World War I and the resulting revolutions of 1917; the rise and development of the Soviet Union from its inception until the present.

Europe, 1500-1815
An examination of the economic, commercial, scientific, social, political, and cultural developments in Europe from the Renaissance to the close of the Napoleonic Wars.

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

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

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

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

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

Constitutional History of the United States
A study in the growth and development of the American constitutional system with emphasis on those aspects of constitutional growth which relate closely to the fundamental structure of American government and social order. Prerequisite: HY 221, 222, or approval of instructor.

Colonial America to 1763
A study of the American colonies within the seventeenth and eighteenth century world with emphasis on social, cultural, political and economic activities of the early Americans. Prerequisite: HY 221 and HY 222, or approval of instructor.

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

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

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

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

Europe in the Seventeenth Century
A study of Europe from the Edict of Nantes to the Peace of Utrecht with major emphasis
upon the Thirty Years' War and the ascendancy of France under Louis XIV. Prerequisite: HY 391 or approval of instructor.

478 Nineteenth Century Europe, 1815-1914 3 hrs.
A study of the major political, social, economic, and intellectual developments in Europe from the Congress of Vienna to World War 1.

Courses at the 500 level are open to students who have completed 15 semester hours in history or 12 semester hours in history with senior standing. Graduate students taking 500 level courses will be expected to do additional research and/or writing.

528 The Emergence of the New Nation, 1789-1850 3 hrs.
A study of the growth of political, social, and economic institutions in the United States and its sections from the time of the Constitution to the Compromise of 1850. Prerequisite: HY 221, 222, or approval of instructor.

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

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

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

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

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

577 The French Revolution and Napoleon, 1789-1815 3 hrs.
An intensive study of European ideas and institutions from the opening stages of the French Revolution through the demise of the Napoleonic Empire.

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

590 Senior Seminar in American History 3 hrs.
A course in historiography, research and writing, and recent interpretations in the field of American history. Open only to seniors who are majoring in, or who have a minor 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 minor in, history.
Directed Readings in History
A program of independent reading in one field of history, to be selected in consultation with an advisor. Open only to seniors majoring in history, with the prior permission of the Department Chairman.

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

Recent Interpretations of Modern History
A course designed to develop the ability to appraise critical historical issues through the study and discussion of recent interpretations of key historical problems in Modern Western History. Prerequisite: Graduate standing or permission of instructor.

Studies in Southern History
Intensive study in selected topics with emphasis on guided research and examination of leading interpretations in Southern history. Prerequisite: Graduate standing or permission of instructor.

Studies in Nineteenth Century American History
Intensive study of selected topics with emphasis on guided research and examination of leading interpretations in nineteenth century American history. Prerequisite: Graduate standing or permission of instructor.

Studies in Twentieth Century American History
Intensive study of selected topics with emphasis on guided research and examination of leading interpretations in twentieth century American history. Prerequisite: Graduate standing or permission of instructor.

Studies in American Foreign Relations
Intensive study in selected topics with emphasis on guided research and examination of leading interpretations in the history of American foreign relations. Prerequisite: Graduate standing or permission of instructor.

Studies in the Renaissance and Reformation
Selected topics in the history of Europe in the late fifteenth, sixteenth, and seventeenth centuries provide the focus for scholarly studies in this era. Under investigation will be certain aspects of such themes as the following: the nature of the Renaissance monarchy, Renaissance humanism, Renaissance diplomacy, the Reformation crisis, and social and economic theories and realities. Prerequisite: Graduate standing or permission of instructor.

Studies in Modern Russian History
An intensive analysis into the transitional developments of the Russian State from the late nineteenth century until the present, concentrating on the similarities and differences between the Tsarist and Communist systems in political, social and economic manifestations. Prerequisite: Graduate standing or permission of instructor.

Directed Readings in History
A program of independent reading in one field of history, to be selected in consultation with an advisor. Open only to graduate students in history, with the prior permission of the Department Chairman.

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

French, German, Russian, Spanish

Professor: Penot; Associate Professor: O'Neal; Assistant Professors: Heller, Stromecky, Traylor (chairperson); Instructor: Fowles

Acquisition of a second language, and through it an understanding of another culture, is not only a personally enriching experience, it is also, today, a valuable and salable commodity.

The language programs are designed to enable the student to use effectively a modern foreign language, both oral and written, in his/her social, business, and professional life.

The Department offers both a major and a minor program in French (FH) and German (GN), and a minor in Russian (RN) and Spanish (SH). In addition the Department directs the Slavic Area Studies Program.

General Education Requirements

Twelve semester hours of credit in one foreign language are required for the B.A. or B.S. degrees, unless the student can demonstrate by placement tests or departmental examination a competence at a level more advanced than the beginning 101 courses. For example:

<table>
<thead>
<tr>
<th>Placement Level</th>
<th>Hours Required</th>
<th>Student Must Take in One Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>101 course (1st level)</td>
<td>12 hours</td>
<td>101, 102, 201, 202</td>
</tr>
<tr>
<td>102 course (2nd level)</td>
<td>9 hours</td>
<td>102, 201, 202</td>
</tr>
<tr>
<td>201 course (3rd level)</td>
<td>6 hours</td>
<td>201, 202</td>
</tr>
<tr>
<td>202 course (4th level)</td>
<td>6 hours</td>
<td>202 and one appropriate 300 level course</td>
</tr>
</tbody>
</table>

Students with Previous Language Training

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

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

A student presenting two or more years of high school credit in a foreign language may enroll in a 100 level course for credit, upon demonstration of a lapse of time (four years or more), 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 courses nor the conversation course on the 300 level in that language. Exceptions may be 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 minor 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. Advanced conversation, advanced grammar and composition, and one literature survey course are required. An additional course on the 300 level will complete the requirement for the minor.

Exemption with Credit

The Department of Modern Foreign Languages gives departmental examinations in the following languages: French, German, Russian and Spanish for students offering high school language study and 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 one course on the 300 level, preferably conversation, in order to satisfy the General Education Requirements for B.A. or B.S. degree.

Native or quasi-native speakers of a language, on the basis of a personal interview and examination, may be granted from 0-15 credit hours, with no letter grade or quality points assigned, except for 3 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. Application for the departmental examination must be made through the Registrar's office. The examination is administered the third Thursday of classes each term.

The Department of Modern Foreign Languages reserves the right to limit the amount of credit obtained by means other than enrollment in a class which may be credited towards a major or supporting minor.

Modern Language (ML) Courses

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

Area of Concentration (AOC) with French Major

Required courses: FH 303, 304, 305, 306, plus three courses on the 400 level and two electives from either the 300 or 400 level.

Area of Concentration (AOC) with German Major

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

Area of Concentration (AOC) with Slavic Area Studies Major

The Slavic Area Studies Program is designed as an enrichment program as well as to prepare students for careers in government, industry, international commerce and trade, and other related areas of work, while at the same time providing the necessary
preparation for further study on the graduate level.

Drawing from four disciplines—Modern Foreign Languages, History, Political Science, and Economics—the Program places emphasis on Russian (language, literature, and culture) and history, with strong supporting work in political science and economics.

Slavic Area Studies, through a controlled program of study, offers the student intensive training aimed at the development of competency in more than one area. At the end of the junior year, a student’s records will be reviewed for competency in the various areas by the Chairman of the MFL Department in consultation with the student and Slavic Studies Committee members.

Requirements for the Slavic Area Studies Program are:

Russian ........................................ 101, 102, 201, 202, 331, 332, 335, 337, 338, and one of the 400 level courses
History ........................................ 101, 102, 375; 376, 591, plus three selections to be approved by the Chairman
Political Science ............................. 101, 205, 305, or 315
Economics ..................................... 300, 400, 585 (two of these courses required)

The student is advised to choose elective courses which will strengthen the major areas or develop ancillary proficiency.

Student advisor for the Program is the Chairperson of the Modern Foreign Language Department, who also chairs the Slavic Area Studies Committee composed of representatives from the participating disciplines.

Area of Concentration (AOC) Models

A student majoring in a foreign language will find a variety of AOC’s which will enable him to develop depth and breadth in the major and related areas: other languages, humanities, social and behavioral sciences, mathematics, engineering, natural sciences, and elementary education. Model AOC’s are available in the Modern Foreign Languages office. A student who wishes to plan his own AOC should do so in consultation with a member of the particular language faculty.

Minor

An AOC requires a minor (see definition and regulations elsewhere in catalog). Possible minors for foreign language majors are available in the Modern Foreign Languages office. See program of studies for foreign language minor.

Modern Languages (ML)

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

French (FH)

101 Elementary French 3 hrs.
102 Elementary French 3 hrs.
Prerequisite: FH 101 or placement.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<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 or placement.</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 grammar review and idiomatic expression. Prerequisite: FH 202 or 303 or approval of instructor.</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 instructor.</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 instructor.</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>310</td>
<td>French for Business and Professions</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Readings and translation (two-way) of materials, documents, and forms pertinent to commerce and the various professions. Individualized instruction. Prerequisite: FH 202 or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>403</td>
<td>Sixteenth Century French Literature</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>A study of the intellectual, philosophical, and aesthetic trends and developments in Renaissance France, utilizing representative works of the period. Prerequisite: FH 305-306 or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>404</td>
<td>Seventeenth Century French Literature</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>A study of masterpieces of French classic authors. Concepts from Malherbe, Boileau, La Fontaine, Pascal. With emphasis on the theater of Corneille, Racine, Moliere. Prerequisite: FH 305-306 or approval by instructor.</td>
<td></td>
</tr>
<tr>
<td>405</td>
<td>Eighteenth Century French Literature</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. Prerequisites: FH 305, 306, or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>406</td>
<td>Nineteenth Century French Novel</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>A study of the principal novelists of the nineteenth century: Balzac, Stendahl, Flaubert, Zola. Prerequisite: FH 305-306 or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>407</td>
<td>French Drama</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>A study of the most influential French dramatists from the 19th century to the present day. Prerequisite: FH 305, 306 or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>408</td>
<td>Twentieth Century French Novel</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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 instructor.</td>
<td></td>
</tr>
</tbody>
</table>
410 **Practicum** 3 hrs.
Interpreting (simultaneous translation) and oral presentations, utilizing the laboratory, guests, (native speakers), periodicals, brochures, etc. Highly recommended as a companion course for *French for Business and Professions*. Individualized instruction. Prerequisite: FH 310 or approval of instructor.

499 **Independent Studies** 3 hrs.
Prerequisite: Approval of Department Chairman.

**German (GN)**

101 **Elementary German I** 3 hrs.

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

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

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

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

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

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

314 **Survey of German Literature** 3 hrs.
A continuation of GN 313. German literature from the end of the 18th Century to the present. Prerequisite: GN 202 or approval of instructor.

316 **German Culture** 3 hrs.
Lectures and discussions on German culture and civilization. Prerequisite: GN 202 or approval of instructor.

318 **German for Business and Professions** 3 hrs.
Readings and translation (two-way) of materials, documents, and forms pertinent to commerce and the various professions. Individualized instruction. Prerequisite: GN 202 or approval of instructor.

412 **Goethe, Schiller and Major Writers of 18th Century** 3 hrs.
With focus on contributions of Goethe and Schiller to German literature, compared with significant works by contemporary writers of the 18th Century: Lessing, Gellert, Klopstock, Herder, Wieland, Lenz, et al. Prerequisite: GN 313-314 or approval of instructor.

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 instructor.
414 The German “Novelle” From Goethe to Kafka 3 hrs.
A study of this important literary genre with emphasis on representative novellas of the 19th Century (Goethe, Tieck, Hoffmann, Kleist, Grillparzer, Droste-Hulshoff, Keller, C. F. Meyer, Kafka and others). Prerequisite: GN 313-314 or approval of instructor.

416 Twentieth Century German Literature 3 hrs.
Emphasis on the study of post-war German literature, short stories and novels, including representative writings of Grass, Boell, Walser, Uwe Johnson, Lenz, Handke, et. al. Also included are outstanding writers of the early 20th Century: Thomas Mann, Hermann Hesse, and Franz Kafka. Prerequisite: GN 313-314 or approval of instructor.

418 Modern German Drama 3 hrs.
Analysis and comparison of German dramas from the 19th Century to present, showing development and diversity of modern German drama including Buechner, Grabe, Hebbel, Hauptmann, Wedekind, Hofmannsthall, Kaiser, Brecht, Duerrenmatt, Frisch, Weiss, et. al. Prerequisite: GN 313-314 or approval of instructor.

419 German Lyric Poetry 3 hrs.
A study and interpretation of selected masterpieces of major German poets from the 18th to the 20th Century. Prerequisite: GN 313-314 or approval of instructor.

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

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

425 Practicum 3 hrs.
Interpreting (simultaneous translation) and oral presentations, utilizing the laboratory, guests, (native speakers), periodicals, brochures, etc. Highly recommended as a companion course for German for Business and Professions. Individualized instruction. Prerequisite: GN 318 or approval of instructor.

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

Slavic Russian (RN)

101 Elementary Russian 3 hrs.

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

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

202 Intermediate Russian 3 hrs.
Prerequisite: RN 201 or placement.

331 Russian Conversation 3 hrs.
Prerequisite: RN 202 or approval of instructor.

332 Advanced Grammar and Composition 3 hrs.
Prerequisite: RN 202 or approval of instructor.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits (Hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>335</td>
<td>Russian Culture and Civilization</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: RN 202 or approval of instructor.</td>
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</tr>
<tr>
<td>337</td>
<td>Survey of Russian Literature</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>A study of Russian literature from its beginning to Pushkin. Prerequisite: RN 202 or approval of instructor.</td>
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</tr>
<tr>
<td>338</td>
<td>Survey of Russian Literature</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>A continuation of RN 337; Russian literature from Pushkin to the present. Prerequisite: RN 202 or approval of instructor.</td>
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</tr>
<tr>
<td>339</td>
<td>Russian Poetry</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>A study of Russian verse from its beginning to Pushkin. An examination of Russian literary-poetic language, with consideration of the role of Church Slavonic, regional dialects and foreign influences as well as the contribution of particular authors. Prerequisite: RN 202.</td>
<td></td>
</tr>
<tr>
<td>340</td>
<td>Russian for Business and Professions</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Readings and translation (two-way) of materials, documents, and forms pertinent to commerce and the various professions. Individualized instruction. Prerequisite: RN 202 or approval of instructor.</td>
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</tr>
<tr>
<td>433</td>
<td>Major Writers of the Nineteenth Century</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>A study of representative works from Pushkin through Chekhov. Prerequisite: RN 337-338 or approval of instructor.</td>
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</tr>
<tr>
<td>439</td>
<td>Gogol</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>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: RN 337-338 or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>440</td>
<td>Dostoevsky</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>A detailed study and analysis of the major works by Dostoevsky, as regards style, ideology, philosophies and technique. Prerequisite: RN 337, 338 or approval of instructor.</td>
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</tr>
<tr>
<td>441</td>
<td>Practicum</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Interpreting (simultaneous translation) and oral presentations, utilizing the laboratory, guests (native speakers), periodicals, brochures, etc. Highly recommended as a companion course for Russian for Business and Professions. Individualized instruction. Prerequisite: RN 340 or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>499</td>
<td>Independent Studies</td>
<td>1-3</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: approval of Department Chairman.</td>
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</tr>
</tbody>
</table>

**Spanish (SH)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits (Hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Elementary Spanish</td>
<td>3</td>
</tr>
<tr>
<td>102</td>
<td>Elementary Spanish</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: SH 101 or placement.</td>
<td></td>
</tr>
<tr>
<td>201</td>
<td>Intermediate Spanish</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: SH 102 or placement.</td>
<td></td>
</tr>
<tr>
<td>202</td>
<td>Intermediate Spanish</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: SH 201 or placement.</td>
<td></td>
</tr>
<tr>
<td>320</td>
<td>Hispanic Culture</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Contrastive Hispanic and American cultural patterns; their cause and effect. Prerequisite: SH 202 or approval of instructor.</td>
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</tr>
</tbody>
</table>
323 Spanish Conversation and Pronunciation 3 hrs.
Prerequisite: SH 202 or approval of instructor.

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

325 Survey of Spanish Literature 3 hrs.
A study of Spanish literature from its beginning to 1700. Prerequisite: SH 202 or approval of instructor.

326 Survey of Spanish Literature 3 hrs.
A continuation of 325. Spanish literature from 1700 to the present. Prerequisite: SH 202 or 325 or approval of instructor.

327 Spanish for Business and Professions 3 hrs.
Readings and translation (two-way) of materials, documents, and forms pertinent to commerce and the various professions. Individualized instruction. Prerequisite: SH 202 or approval of instructor.

420 Practicum 3 hrs.
Interpreting (simultaneous translation) and oral presentations, utilizing the laboratory, guests, (native speakers), periodicals, brochures, etc. Highly recommended as a companion course for Spanish for Business and Professions. Individualized instruction. Prerequisite: SH 327 or approval of instructor.

423 Cervantes: Don Quixote 3 hrs.
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 instructor.

424 Golden Age Drama 3 hrs.
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 instructor.

427 Spanish American Novel 3 hrs.
Representative novels of the modern period which reflect the cultural, economic, political and social concerns of the Spanish American republics, nationally and internationally. Prerequisite: SH 326 or approval of instructor.

429 The Generation of '98 3 hrs.
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 instructor.

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

Music
Professor: Boyer (chairman), Pales; Associate Professor: Cavanagh; Assistant Professor: Contreras; Instructor: Shingler

B.A. Degree in Music

The Bachelor of Arts degree in Music, with emphasis in either performance or music literature, is a program of 134 credit hours providing ample training and experience in
performance, sufficient foundation in theory and literature, and is built upon the belief that a liberal arts base better prepares the musician and musician/teacher. The degree will provide the foundation most students need for graduate study and many professional musical opportunities. In order to minimize degree hours, a music major should choose a supporting minor 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 Department of Music office.

B.A. Degree in Music Education

The Bachelor of Arts degree in Music Education is a 140 credit hour program built upon a broad liberal arts base, integrating music and professional education courses to develop a superior music teacher, certified to teach at all levels (Class B, Elementary-Secondary Professional Certificate) with strength in either vocal or instrumental music. The program is competency based. Students must demonstrate throughout their course work competencies in both performance and teaching. Due to the demands of this program, there is little opportunity to elect courses other than those required and outlined below. Students should expect to spend a minimum of thirteen terms to complete the degree requirements. With additional study of the principal instrument and a Senior Recital performance, music education students are eligible to receive a special "Performance Certificate." Faculty approval is required.

Bachelor of Arts Degrees in Music and Music Education

I. General Education Requirements

        44-54 hrs.
General Education Requirements for the B.A. degree are listed in the Academic Information section of this catalog. For the performance and literature emphasis programs, it is recommended that philosophy be selected for the social science requirement, and either French or German to satisfy the language requirement. Students emphasizing music education may not select psychology to satisfy their social science requirement, and they must select Option C or D to satisfy the science/mathematics requirements. Also, they must include speech (CM) 110, 113 or 214 for teacher certification.

II. Area of Concentration (AOC)
(Select either A or B)

        maximum of 70 hrs.

A. Music Performance or Literature Emphasis

Major

MU 1-1/4-3 Principal Instrument* ........................................ 16
(12 terms; 8 hours upper level)
MU 1-0/2-0 Secondary Instrument (6 terms) ................................. 4
MU 101, 102, 103, 201, 202 Theory-Harmony .............................. 15
MU 110 Introduction to Music ............................................... 3
MU 311, 312 Music History .................................................. 6
MU 401 20th Century Materials and Techniques ............................. 3
MU 325 Conducting ............................................................. 2

132
Upper level music elective ................................................................. 2
Ensembles** ................................................................................. 3-6
Junior Recital .................................................................................. 0
Senior Recital .................................................................................. 0

*Students electing the Music Literature emphasis will be limited to 12 hours (rather than 20 hrs.) of studio instruction. Eight hours of appropriate upper level music literature and history courses will replace the studio work. The Junior and Senior Recitals will be replaced by other special projects.

Minor

(Should be selected from a discipline represented in fulfilling General Education Requirements.)

B. Music Education Emphasis (Composite Major/Minor)

Music Performance, Theory and Literature

MU 1-0/4-0 Principal Instrument ...................................................... 8
(12 terms; 4 hours upper level)
Junior Recital (solo and ensemble works) ........................................ 0
Secondary Instrument(s): (6 terms) .................................................. 4
Voice Principals will elect piano, MU 130-230
Piano Principals will elect voice, MU 140-240
Instrumental Principals will elect from below:
one course in percussion, MU 184
two courses in strings, MU 154, 254
two courses in woodwinds, MU 164, 264
two courses in brasses, MU 174, 274 (one course to be deleted in Principal Instrument area)

Ensembles** ................................................................................. 3-6
MU 101, 102, 103, 201, 202 Theory/Harmony ................................... 15
MU 110 Introduction to Music .......................................................... 3
MU 311, 312 Music History ............................................................... 6
MU 401 20th Century Materials and Techniques ............................... 3
MU 325 Conducting .......................................................................... 2
MU 425 Advanced Conducting and Instrumentation ........................ 3

Music Education

MU or ED 326 Teaching General Music in Elementary Schools .......... 3
MU or ED 327 Teaching General Music in Secondary Schools .......... 3
MU 428 Organizing and Directing Vocal Groups in Secondary Schools 3
or
MU 429 Organizing and Directing Instrumental Groups in Secondary Schools .... 3

Professional Education

ED 230 Human Development .......................................................... 3
ED 261 Foundations of Education in U.S. ......................................... 3
ED 263 Educational Psychology ....................................................... 3

133
ED 490 Principals of High School Teaching ........................................... 3
ED 492, 498 Student Teaching*** ....................................................... 9

**An appropriate ensemble must be selected each term enrolled as a full-time student. Students shall complete a minimum of 12 terms of small and large ensemble experiences; however, a maximum of 6 hours may count toward degree accumulation.

***Students must pass a piano competency examination prior to student teaching. ED 490 must be taken concurrently with Student Teaching.

III. Electives (outside of AOC areas) .................................................. 6-20 hrs.

(Minimum: Performance and Music Literature, 12 hrs.; Music Ed. 6 hrs.)

Music majors are required to attend at least six approved concerts per term; music minors must attend three. Thirty percent of the degree requirements must be upper-level courses.

Minor 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>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Studio Instruction 1-0 and 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>
</tbody>
</table>

Total: 25 hours

Music (MU)

100 Fundamentals of Music ......................................................... 3 hrs.

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

101 Theory of Music I ............................................................... 3 hrs.

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

102 Theory of Music II .............................................................. 3 hrs.

A continuation of MU 101. Prerequisite: MU 101.

103 Theory of Music III ............................................................. 3 hrs.

A continuation of MU 102. Prerequisite: MU 102.
109 Creative Dance (Basic Modern Technique) 1 hr.
Exploring time and space through movement. Developing proper body placement, control and agility while stimulating creative thinking.

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

111 American Folk Music and Jazz 3 hrs.
An introductory study of the history and development of American folk music and jazz. Special attention is given to current developments.

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.
Continuation of MU 201. Prerequisite: MU 201.

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

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

210 Music with the Maestro 3 hrs.
A listening survey of music masterpieces for students without any formal musical training, and for those who desire more exposure to great music. Focus is on listening and how to listen, rather than a philosophical and historical approach. Classes include live performances, records, films, and informal discussion with musicians.

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, and planning and presentation.

304 Analysis of Music Form 2 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 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 3 hrs.
A survey of the development of music as an art in Western civilization from 1750 to the present. Emphasis is given to formal and stylistic problems through the study of representative works and an understanding of specific musical concepts in light of their historical and general cultural context. Prerequisite: MU 103, 110, or approval of instructor.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>313</td>
<td>Survey of a Musical Form</td>
<td>2 hrs.</td>
<td>Topic varies. A study of a musical form from its origins to the present time. Prerequisite: MU 202, and 311 or 312.</td>
</tr>
<tr>
<td>314</td>
<td>Biographical Survey</td>
<td>3 hrs.</td>
<td>Topic varies. A study of the life and works of great composers of music. Prerequisite: MU 202, and 311 or 312.</td>
</tr>
<tr>
<td>320</td>
<td>Piano Pedagogy</td>
<td>2 hrs.</td>
<td>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.</td>
</tr>
<tr>
<td>321</td>
<td>Piano Technology</td>
<td>1 hr.</td>
<td>A practical course for pianists designed to provide an understanding of the development of keyboard instruments, equal temperament tuning, and piano action regulation and repair.</td>
</tr>
<tr>
<td>322</td>
<td>Conducting</td>
<td>2 hrs.</td>
<td>Basic techniques of choral and instrumental conducting. Prerequisite: MU 103 or approval of instructor.</td>
</tr>
<tr>
<td>326</td>
<td>Teaching General Music in Elementary Schools</td>
<td>3 hrs.</td>
<td>Materials and methods. Emphasis on developing teaching competencies. Prerequisites: MU 103, 110 or permission of instructor. (Students in teacher certification program should utilize ED prefix.) Same as ED 326.</td>
</tr>
<tr>
<td>327</td>
<td>Teaching General Music in Secondary Schools</td>
<td>3 hrs.</td>
<td>Materials and methods. Emphasis on developing teaching competencies. Prerequisites: MU 103, 110 or permission of instructor. (Students in teacher certification program should utilize ED prefix.) Same as ED 327.</td>
</tr>
<tr>
<td>401</td>
<td>20th Century Materials and Techniques</td>
<td>3 hrs.</td>
<td>An introduction to the systems of tonal organizations, compositional procedures, terminology, and analytical methods that relate to music of our century. Prerequisite: MU 202 and 312 or approval of instructor.</td>
</tr>
<tr>
<td>410</td>
<td>Piano Literature</td>
<td>2 hrs.</td>
<td>Survey of music for string keyboard instruments from the pre-pianoforte period to the present including representative works from all periods. Prerequisite: MU 202, 312 or permission of instructor.</td>
</tr>
<tr>
<td>411</td>
<td>Musicum Practicum</td>
<td>1 hr.</td>
<td>Courses of study and activity developed and submitted to the music faculty for approval by the student(s). Projects should reinforce learning and performance experience. May be repeated, but no more than two hours will count toward degree requirements.</td>
</tr>
<tr>
<td>425</td>
<td>Advanced Conducting and Instrumentation</td>
<td>3 hrs.</td>
<td>Further development of conducting techniques and communication with an emphasis on score reading of instrumental and choral-instrumental compositions. Includes a study of basic instrumentation. Prerequisite: MU 325. Offered upon demand.</td>
</tr>
<tr>
<td>428</td>
<td>Organizing and Directing Vocal Groups in Secondary Schools</td>
<td>3 hrs.</td>
<td>Repertoire, procedures for administering and teaching school glee clubs, choirs and vocal</td>
</tr>
</tbody>
</table>
ensembles. Prerequisites: MU-ED 326, 327 and MU 425 or permission of instructor. (Students in teacher certification program should utilize MU prefix.)

429 Organizing and Directing Instrumental Groups in Secondary Schools 3 hrs.
Repertoire, procedures for administering and teaching school bands, orchestras and instrumental ensembles. Prerequisites: MU-ED 326, 325 and MU 425 or permission of instructor. (Students in teacher certification program should utilize MU prefix.)

510 Concert Band Literature and Conducting Critique 3 hrs.
An investigation and study of a wide scope of literature for concert band/wind ensemble. Emphasis on a variety of music (type, style, and difficulty) as well as in-depth study of a few scores by each student for critiques of rehearsal and conducting techniques. The UAH Summer Band to serve as a reading and laboratory ensemble. Prerequisites: MU 325; junior standing in music; permission of instructor.

Applied Studio and Class Instruction

Students must fill out a Request for Studio Instruction card obtained in the Music Office prior to each term enrolled. All beginning and transfer students who plan to take private instruction for music credit are required to demonstrate their level of proficiency to the instructor prior to registration. Instruction varies from 40 to 60 minutes weekly.

To advance to the next one hundred level of studio 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, and it may raise or lower the instructor's grade one degree. Students not intending to major or minor in music should enroll in MU 130, 140, 150, 160, or 170 and do not require a jury. They may repeat private instruction as long as the instructor agrees that satisfactory progress is made. A special studio instruction fee is charged (see section on Fees).

Attendance at the monthly Student Recital Program and special performance classes are required of all students taking Studio Instruction. A student can be excused only with the written permission of the Department Chairman.

130 Studio Instruction in Keyboard (piano and organ) 2/3 hr.
For Music Education emphasis, secondary instrument or non-music credit. May be repeated. Studio Instruction Fee: Level 4. Prerequisite: approval of instructor.

230 Studio Instruction in Keyboard 2/3 hr.
For Music Education emphasis or secondary instrument credit. May be repeated. Studio Instruction Fee: Level 4. Prerequisite: MU 130 and approval of instructor.

330 Studio Instruction in Keyboard 2/3 hr.
For Music Education emphasis or secondary instrument credit. May be repeated. Studio Instruction Fee: Level 4. Prerequisite: MU 230 and approval of instructor.

430 Studio Instruction in Keyboard 2/3 hr.
For Music Education emphasis or secondary instrument credit. May be repeated. Studio Instruction Fee: Level 4. Prerequisite: MU 330 and approval of instructor.

131, 132, 133, 231, 232, 233, 331, 332, 333, 431, 432, 433
Studio Instruction in Keyboard 1-1/3 hrs.
For principal instrument music credit, Studio Instruction Fee: Level 5. Prerequisite: approval of instructor.
193 Summer Chorus
Mixed voices singing a variety of choral music.

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

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

197 Summer Band
Rehearsal and performance of a variety of music for the concert band. By audition with conductor.

198, 398 Huntsville Symphony Orchestra
The Civic Symphony of some seventy-five players with international guest artists. Major symphonic, operatic, and choral literature is performed. By audition with conductor.

199, 399 UAH Wind Ensemble
Open to all students of the University by audition with the conductor. Prepares and performs the finest music literature for wind ensemble and concert band. Attendance at all rehearsals and performances required.

297 Jazz Workshop
The jazz workshop provides two broad opportunities for students who participate, the performance of jazz, both written and improvised, and instruction in jazz arranging and composition and improvisation. Performing ability is required. By audition with instructor.

299 University Brass
A musical organization for the rehearsal and performance of selected ensemble literature for brass instruments. Open to all students of the University by audition with the conductor. Attendance at all rehearsals and performances required.

Philosophy

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 Minors

Students interested in a philosophy minor are required to take at least 21 semester hours in philosophy including at least 6 semester hours in courses numbered 300 or above. Recommended minors are available from the philosophy faculty upon request.

Appropriate philosophy courses may also be used to form part of a program of cognate studies with other disciplines. Such a program 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.
<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Introduction to Philosophy</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>An introduction to the fundamental problems of experience.</td>
<td></td>
</tr>
<tr>
<td>102</td>
<td>Introduction to Logic</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>An introduction to the methodology of correct reasoning.</td>
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<tr>
<td>103</td>
<td>Introduction to the Philosophy of Art</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>A survey of the major theories of art from Plato to the present day, with special emphasis on the analysis of the concepts of art in common among such theories.</td>
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<tr>
<td>104</td>
<td>Introduction to Social and Political Philosophy</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>A survey of the major attempts to justify the exercise of political power at the expense of individual liberty from Plato to Mill.</td>
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<tr>
<td>105</td>
<td>Introduction to Ethics</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>A study both of the major theories of ethics, from Aristotle to Utilitarianism, and of the major theories about theories of ethics, from naturalism to prescriptivism.</td>
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<tr>
<td>106</td>
<td>Introduction to the Philosophy of Religion</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>An examination of the major proofs for God's existence that have been offered in the Judeo-Christian tradition and a study of the role which the possibility of proving God's existence has played in religion (in the western world).</td>
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<tr>
<td>201</td>
<td>History of Western Philosophy</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>From the earliest Greek philosophers to Plato: an introduction to the presocratic philosophers, Socrates and Plato, with emphasis on Plato.</td>
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<tr>
<td>202</td>
<td>History of Western Philosophy</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>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.</td>
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<tr>
<td>203</td>
<td>History of Western Philosophy</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>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.</td>
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</tbody>
</table>

The following courses are open to students who have at least junior standing or have completed at least 6 hours of philosophy or are approved by the instructor.

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>304</td>
<td>History of Western Philosophy</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
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</tr>
<tr>
<td>305</td>
<td>History of Western Philosophy</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
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<tr>
<td>306</td>
<td>Contemporary European Philosophy</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>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.</td>
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<tr>
<td>312</td>
<td>Contemporary Anglo-Saxon Philosophy</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>An introduction to some twentieth century philosophers such as James, Bertrand Russell,</td>
<td></td>
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</tbody>
</table>
Carnap and Wittgenstein, with emphasis on pragmatism, logical atomism, logical positivism and philosophical analysis. Prerequisite: PHL 101 and one course in the history of philosophy, or approval of instructor.

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

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

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 of philosophy including PHL 101 or approval of instructor.

352 **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.

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**

Associate Professor: White (chairman); Assistant Professors: MacDougall, Rainey, Schiltz

**Area of Concentration (AOC) With Political Science Major**

A student who wishes to major in political science must include in his academic program a minimum of 36 semester hours in political science, including PSC 101, 231 (statistics), and a minimum of 15 semester hours in courses numbered 300 or above, two of which must be PSC 300 and 499.

A student developing an area of concentration with a political science major must choose a minor consisting of 21 semester hours of courses drawn from a discipline other than political science. At least 6 hours in the minor must be in courses numbered 300 or above. In lieu of a minor, the student has the option of choosing 21 hours in cognate studies, a group of courses drawn from two or more disciplines of which 9 hours must be in upper-level course work.
Freshmen considering a major in political science should consult with a faculty 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 department 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)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
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<tbody>
<tr>
<td>102</td>
<td>Problems of American Government</td>
<td>3 hrs.</td>
<td>A survey of outstanding problems now confronting government in areas of foreign and domestic policy such as defense, economic policy, civil rights, technology, pollution, social welfare, business regulation, education, and urban decay. Prerequisite: PSC 101 or permission of the instructor.</td>
</tr>
<tr>
<td>201</td>
<td>Southern Politics</td>
<td>3 hrs.</td>
<td>An examination of the nation's most distinctive political region with consideration given to both state and national politics. Prerequisite: PSC 101.</td>
</tr>
<tr>
<td>202</td>
<td>Urban Politics</td>
<td>3 hrs.</td>
<td>An introduction to the study of urban politics in America with attention given to urban environment, governmental forms, power structures, and policy outputs. Prerequisite: PSC 101 or approval of the instructor.</td>
</tr>
<tr>
<td>205</td>
<td>Western European Constitutional Systems</td>
<td>3 hrs.</td>
<td>An examination of the political systems of Great Britain, France, and West Germany. Prerequisite: PSC 101 or approval of the instructor.</td>
</tr>
<tr>
<td>231</td>
<td>Applied Statistics for Social and Behavioral Science</td>
<td>3 hrs.</td>
<td>Collection, classification, and presentation of data, measures of central tendency and dispersion, introduction to probability distribution and sampling theory, confidence limits and tests of significance, chi-square and “t” distribution. Prerequisite: college algebra or approval of instructor.</td>
</tr>
<tr>
<td>247</td>
<td>English Constitutional History to 1603</td>
<td>3 hrs.</td>
<td>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.</td>
</tr>
<tr>
<td>248</td>
<td>English Constitutional History Since 1603</td>
<td>3 hrs.</td>
<td>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.</td>
</tr>
</tbody>
</table>
Principles of Public Administration

An examination of administrative principles and practices in public organizations and agencies. Prerequisite: PSC 101.

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

Political Analysis

An examination of political science and the philosophy and logic of scientific inquiry. Attention will be given to data and bibliographic sources and to useful techniques in data analysis, including an introduction to simple computing for political scientists. Prerequisite: 9 hours in political science. May be taken before PSC 231. Required of all students majoring in political science.

Totalitarian Governments

An examination of the nature of totalitarianism and a study of political practices, ideologies, and behavior in selected communist and non-communist countries.

American Federalism

An analysis of the functioning and importance of federalism as an aspect of the American political system. Consideration is given to the role of the states as partners in the federal arrangement and to their capacity to act as effective units of government.

Introduction to International Politics

An examination of the basic factors underlying the conduct of international relations focusing upon the evolution of the present state system. Special attention is given to the problems of balance of power, bi-polarity, sub-systems, and diplomacy.

Political Development and Modernization

A study of the growth and decay of struggling political systems, of problems of modernization and of political responses to the requirements of economic and social development. Emphasis will be on countries of the Third World. Selected topics include nation building, political participation, economic development, and elite strategies-of-rule.

Politics in China

An overview of developments in China since 1900, with particular emphasis on the politics of the People's Republic of China. Themes to be stressed are the origins of the revolution, the role and ideology of Mao-Tse-Tung, and the political and economic modernization of China since 1949.

International Law and Organization

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.

Mass Political Behavior

An examination of the nature and causes of political activity in mass electorates, the dynamics of the decision to vote and whom to vote for, and the mediating effects of election law. Emphasis on American presidential elections.

Political Socialization

A study of the development of attitudes and behavior patterns relevant to politics. Topics include developmental models, belief systems, consequences for political institutions. Data emphasizes mass publics and single elite actors.

The American Legislative Process

An examination of the American legislative process with attention given to the institutional setting and process of decision-making, recruitment and socialization of legislators, influence
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 Thought 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 Politics and 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.

399 Directed Study in Political Science 1-3 hrs.
A program of independent studies in an area of political science selected in consultation with a faculty advisor.

Courses listed below are open to students who have completed 15 hours of political science or who have senior standing.

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 202 or permission of the instructor.

425 Latin American Politics 3 hrs.
A study of social and political change in contemporary Latin America, with emphasis on Mexico, Cuba, Columbia, Peru, Chile, Argentina, and Brazil. Prerequisite: 15 hours of political science or permission of the instructor.

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 economic interaction. Prerequisite: PSC 315.

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

500 Studies in Political Science
1-3 hrs.
Special studies and projects in an area of political science.

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 program 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.

Psychology

Professor: Rogers; Associate Professors: Coffield, Sullins (chairman); Assistant Professors: Hays, James, Kirkpatrick

Area of Concentration (AOC) with Psychology Major

A student who majors in psychology must include in his academic program a minimum of 36 semester hours in psychology, with at least 15 hours of these courses numbered 300 or above. Required courses are PY 103, 113, 204, 231, 426 and either one Experimental Psychology course and two Human Research courses, or two Experimental Psychology courses and one Human Research course.

The Psychology major described above will form a part of an area of concentration which must include one of the following variations: (1) An established minor 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 minor 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) An area of cognate studies drawn from two or more disciplines which includes a minimum of 21 semester hours, of which 9 hours must be in courses numbered 300 or above.

A student planning to major in psychology is advised to take PY 103, 113, 204, and 231 before entering more advanced courses. At least as soon as these courses are completed the student should seek advice in planning an AOC from a faculty member in the Department of Psychology.

Psychology Minors

A student using psychology as a minor (variation No. 1 above) must include 21 hours of psychology courses, including PY 103, 113, 204, and either one Experimental Psychology course and one Human Research course, or two Experimental Psychology courses. Appropriate psychology courses may also form a part of an area of cognate studies with other disciplines in support of the student's major. Such a program must be approved by the chairman of the student's major department and must meet the requirements established in variation 3 above.

The 6 hour General Education Social Sciences requirement may be satisfied by taking both PY 103 and PY 113. PY 103 and PY 113 are both required for all students taking more than 15 hours in psychology. Either PY 103 or PY 113 may be taken first, but they may not be taken at the same time.

Psychology (PY)

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.)

113 Principles of Behavioral Analysis 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.)

204 Laboratory Procedures 3 hrs.
An introduction to behavioral research techniques and descriptive statistics. Includes laboratory. Fee: Level 3. Prerequisite: PY 103, 113. 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 103, 113.

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 BUS 231, EC 231, PSC 231 and SOC 231.)
300 Experimental Psychology: Learning
The study of the role of reinforcement in the acquisition and modification of behavior. Both empirical and theoretical material is considered. Includes laboratory. Fee: Level 3. Prerequisite: PY 204.

304 Experimental Psychology: Perception and Judgment
A functional analysis of the processing and interpretation of sensory information and of decision processes. Includes laboratory. Fee: Level 3. Prerequisite: PY 204.

311 Individual Differences
A study of the factors, both learned and innate, that lead to individually unique patterns of behavior. Prerequisite: PY 103, 113.

313 Psychometrics
Theory and practice within psychological testing. Prerequisite: PY 103, 113, 231.

315 Developmental Psychology
The study of theory and issues pertinent to developmental processes in human organisms. Implications of both theory and empirical data will be emphasized. Prerequisite: PY 103, 113.

330 Communication Theory and Research
An intensive study of various theories, problems and research in the areas of interpersonal, nonverbal and mass communication, formulating a psychological conception of mass as an information-gathering and information-processing system. Emphasis is placed on empirical findings of the modes, media and the effects of various communication forms. Prerequisite: PY 103. (Same as CM 330.)

375 Social Psychology
An analysis of the fundamental principles of group structure. Emphasis is placed upon such topics as development of group solidarity, cohesion, intergroup conflict and cooperation, and the effects of different patterns of leadership. Prerequisite: SOC 100 or PY 103 or 113. (Same as SOC 375.)

390 Readings in Psychology
Supervised readings in depth in an area of particular interest to the student. Prerequisite: 15 hours PY and approval of instructor. May be taken twice for credit.

391 Special Topic in Psychology
Pre-announced special areas are studied via seminar discussion, laboratory work, or practicum. Prerequisite: 15 hrs. PY. May be taken twice for credit.

392 Special Topic in Psychology
Pre-announced special areas are studied via seminar discussion, laboratory work, or practicum. Prerequisite: 15 hrs. PY. May be taken twice for credit.

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

410 Human Research: Developmental
The study of the effects of the environment upon cognitive and social development in both humans and animals. Includes laboratory. Fee: Level 3. Prerequisite: PY 231, 315.
411 Human Research: Motivation and Emotion 4 hrs.
The study of the origin and utility of motivational and emotional dynamics. Includes laboratory. Fee: Level 3. Prerequisite: PY 300 or 304.

412 Human Research: Personality 4 hrs.
A study of the basic problems, procedures, and theoretical issues involved in personality research. Includes laboratory. Fee: Level 3. Prerequisite: PY 300 or 304; and PY 401.

413 Human Research: Social Psychology 4 hrs.
Empirical investigation of topics in social psychology, with consideration of various techniques for examining social influence and group-individual relationships. Includes laboratory. Fee: Level 3. Prerequisite: PY 204 or SOC 300; and PY/SOC 375.

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

422 Individual Research 3 hrs.
The student, with the advice of an instructor, will design and execute an original experiment in psychology. Prerequisite: One Human Research course, and approval of instructor. 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: 15 hrs. PY.

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

436 Physiological Psychology 3 hrs.
A functional analysis of the neural and endocrinological systems underlying behavior. Prerequisite: (either “a” or “b”) (a) 15 hrs. PY or approval of instructor; (b) BY 114 or BY 213 and 6 hrs. of PY or approval of instructor. Same as BY 436.

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

502 Industrial Psychology 3 hrs.
Application of the basic principles of learning, motivation, and perception to typical industrial problems. Prerequisite: approval of instructor.

503 Advanced General Psychology 3 hrs.
A comprehensive survey of the various major areas of psychology. Open only to senior psychology majors. Prerequisite: 24 hrs. PY and senior standing.

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

528 Human Learning Theory 3 hrs.
Critical examination of behavioral changes commonly called “learning,” as well as closely related behavioral phenomena such as transfer, retention, and stimulus generalization.
529 Behavior Modification 3 hrs.
Presents the basic psychological principles concerning the control of human behavior and reviews current theoretical and experimental research in the field of behavior modification.

530 Statistics and Methodology 3 hrs.
An overview of experimentation, data presentation and analysis, and research report writing. Inferential statistics emphasized. Laboratory work included.

531 Individual Mental Testing: Stanford-Binet 3 hrs.
Various assessment techniques stressed, but particular emphasis is given to the Stanford-Binet. Both theory and practice are utilized. Includes laboratory. Fee: Level 3. Prerequisite: approval of instructor.

532 Individual Mental Testing: Wechsler 3 hrs.
Individual testing with the Wechsler tests, along with practical experience. Includes laboratory. Fee: Level 3. Prerequisite: PY 531.

Sociology

Associate Professor: Tarter; Assistant Professors: Burton (chairman), Grzyb, Hodges; Adjunct Associate Professor: Kilgo

Area of Concentration (AOC) with Sociology Major

Requirements for a major are 36 semester hours of sociology including SOC 100, 102, 231, and 465. A minimum of 15 hours should be taken in courses numbered 300 or above. Up to six hours of the 36 hours 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 minor exclusively in sociology, with a major in another discipline, would be required to complete 21 hours of sociology courses including SOC 100, 102, and 300. A minimum of 9 hours should be in courses numbered 300 or above. Supportive cognate studies 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, 310, 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.

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

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

Mass Media in America: Theory and Criticism 3 hrs.
A survey of mass communication theory, the history of American mass media, and criticism of the contemporary forms and functions of the mass media of communication in the United States. (Same as CM 130.)

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.

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 BUS, EC, PSC and PY 231.

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.

Upper division sociology courses are open to students who have taken SOC 100 and SOC 102, or have taken SOC 100 and have approval of the instructor.

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.

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.

Sex Roles 3 hrs.
Examination of social and sexual roles, their interrelationships, and articulation with societal institutions and agencies. Emphasis is placed upon the social upheaval which is both cause and effect of sex-role changes in societies in transition.

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.

Population and Ecology 3 hrs.
Surveys the growth and distribution of world population and the environmental problems created in relation to population growth.

Deviance and Social Control 3 hrs.
Study of the social construction of deviant behavior and societal reactions to it.

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.
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. Same as ED 325.

330 Minority Groups 3 hrs.
Nature of minorities: status differentiation and group structure; institutional trends; intergroup relations.

333 Regional Sociology: The South 3 hrs.
An analysis of the contemporary South focusing on the unique social processes and cultural heritage leading to its development. Special emphasis is placed on the cultural diversity which underlies the belief systems of Southerners.

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. Same as PY 375.

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.

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.

400 Applied Research Methods 3 hrs.
The logic of social field research and development of appropriate tools for the collection of relevant data. Prerequisite: SOC 100, 102, 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.

440 Sociology of Religion 3 hrs.
The application of sociological principles to religious institutions, emphasizing the interaction religion and society. Considers such phenomena as sects and cults, the religious commune, religion and social change, and contemporary religious issues.

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 paramedical personnel in the United States, as well as
analysis of health care delivery systems and problems encountered therein.

451 Sociology of Death
An analysis of the influences of death on society and how societies attempt to control and
institutionalize behaviors related to death. Emphasis is placed upon contemporary societies
and philosophical issues related to life and death with special attention to suicide.

452 Sociology of Mental Health
Study of the social construction of mental health and mental illness. Includes an analysis of
mental hospitals, community mental health centers, and the mental health movement.

455 Sociology of Work and Occupations
A critical analysis of contemporary work situations and experiences. Emphasis placed upon
alienation in work, the impact of technological change and bureaucratization, primary work
groups and work culture, professionalization, unionization, workers' self-management
experiments, and the work-leisure relationship.

465 Sociological Theory
A study of the development of the discipline of sociology in terms of the major trends of
sociological theory, past and present, and the major theoretical problem areas of the
discipline. Includes study of the nature of sociological theory in relation to other disciplines.
Prerequisite: SOC 100, 102, and junior or senior standing.

480 The Sociology of the Future
Designed to cover the major theories of social change. Emphasis is placed upon the impact of
technology on social institutions with a brief introduction to technology forecasting and
assessment. The primary focus of the course is upon future development of social institutions.

490 Sociology of Poverty and Deprivation
A sociological analysis of poverty and deprivation as variables in social life. Emphasis is
placed on the social and psychological effects of deprivation and on the nature and
effectiveness of programs to combat it. Offered on demand.
School of Science and Engineering

Dean: J. Hoomani, Associate Professor of Mathematics

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

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

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

At the graduate level, the School of Science and Engineering offers programs that lead to the Master of Arts degree in mathematics, Master of Science degree in biology, chemistry, and computer science, Master of Science in Engineering degree with several areas of specialization (see the section concerning engineering programs), Master of Science in Operations Research degree, and Master of Science degree in physics. The School also offers the Doctor of Philosophy degree in engineering (again with several areas of specialization), and the Doctor of Philosophy degree in physics. The Ph.D. degree in chemistry and mathematics can be obtained through a cooperative program with the University of Alabama, University, with one year residency at the Tuscaloosa campus.

Programs are administered by seven academic departments, the Office of the School of Science and Engineering and the Office of the School of Graduate Studies. 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, Clark, Leonard, Wilson (chairman); Assistant Professors: Campbell, Eley, Evans, Lewis, Modlin; Adjunct Professor of Immunology: Montgomery

Undergraduate Programs

A student may elect a program leading to either a Bachelor of Arts or a Bachelor of Science degree. In most areas of biological interest, a Bachelor of Science degree is deemed more desirable; however, a Bachelor of Arts degree may be preferred in areas of concentration (AOC) relating biology to some of the humanities, social sciences, and economics.

All areas of concentration with a major in biology will include the core courses as indicated below. This does not apply to students in medical technology programs. The biology courses BY 113-114 must be taken or exempted but cannot be counted toward a major. The core courses will include one course from anatomy and morphology (either botanical or zoological), and one course in physiology. General Genetics (BY 319) is highly recommended for all biology majors and minors. The additional hours elected to constitute the minimum of 30 semester hours required for a degree in biology may be taken in accordance with the individual student’s goal. BY 492 is strongly recommended for students in curricula preparatory to graduate study. Seniors must take a minimum of two seminar credits.

For those students who elect premedical, predental, and medical technology programs, it is recommended that they consult the curriculum designed for these areas of vocational and academic pursuits.

Students placing in chemistry and mathematics courses below the level indicated in the curricula listed below are considered deficient in these areas. These students will be required to take the necessary courses to remove deficiencies. Courses taken to remove deficiencies cannot be counted toward the hours required in each curriculum but may be counted as elective hours.

A minor in biology will consist of 21 hours to include BY 113, 114 (or equivalent) and at least 6 hours numbered 300 or above.

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.

Curriculum I

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

<table>
<thead>
<tr>
<th>Semester Hours</th>
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</thead>
<tbody>
<tr>
<td>General Education Requirements (humanities and social sciences)</td>
</tr>
<tr>
<td>Biology core courses and biology electives</td>
</tr>
<tr>
<td>Chemistry (to include 131 or 331)</td>
</tr>
<tr>
<td>Physics</td>
</tr>
</tbody>
</table>

155
Mathematics .................................................. 3-
Humanities, social sciences, economics or associated cluster .................... 2-
Electives (education core if a Class B Secondary Professional Teaching
Certificate is desired) ........................................... 27-30

Curriculum II

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

<table>
<thead>
<tr>
<th>Semester Hours</th>
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<tbody>
<tr>
<td>General Education Requirements (humanities and social sciences)</td>
</tr>
<tr>
<td>Biology core courses and biology electives</td>
</tr>
<tr>
<td>Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362</td>
</tr>
<tr>
<td>Mathematics—MA 121, 153, 154</td>
</tr>
<tr>
<td>Physics—PH 101, 102 (PH 111, 112 may be taken)</td>
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<tr>
<td>Education core</td>
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<tr>
<td>Electives</td>
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Curriculum III

B.S. Degree, Preparatory for General Graduate Study

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<tr>
<th>Semester Hours</th>
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<tbody>
<tr>
<td>General Educational Requirements (humanities and social sciences)</td>
</tr>
<tr>
<td>Biology core courses and biology electives</td>
</tr>
<tr>
<td>Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362</td>
</tr>
<tr>
<td>(341 desirable)</td>
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<tr>
<td>Mathematics—MA 153, 154 (3 additional hours)</td>
</tr>
<tr>
<td>Physics—PH 101, 102 (PH 111, 112 may be taken)</td>
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<tr>
<td>Electives</td>
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Curriculum IV

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

<table>
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<tr>
<th>Semester Hours</th>
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<tbody>
<tr>
<td>General Education Requirements (humanities and social sciences)</td>
</tr>
<tr>
<td>Biology core courses and biology electives</td>
</tr>
<tr>
<td>Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362</td>
</tr>
<tr>
<td>Mathematics—MA 153, 154 (3 additional hours)</td>
</tr>
<tr>
<td>Physics—PH 101, 102, 201 (PH 111, 112 may be taken)</td>
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<tr>
<td>Electives</td>
</tr>
</tbody>
</table>

Curriculum V

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

<table>
<thead>
<tr>
<th>Semester Hours</th>
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</thead>
<tbody>
<tr>
<td>General Education Requirements (humanities and social sciences)</td>
</tr>
</tbody>
</table>
Biology core courses and biology electives ........................................... 30-32
Chemistry—CH 121, 123, 125, 126, 331, 332, 335, 361, 362 ..................... 17
Mathematics—MA 153, 154, 233, 244, 385 ............................................. 15
Physics—PH 111, 112, 201, 241, 331, 351 ............................................. 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 and 361
or BY 361, 543, 544, & 545) ......................................................... 30-32
Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 333, 335, 336
341 (341 desirable) ................................................................. 20-23
Mathematics—MA 153, 154, 233 ..................................................... 9
Physics—PH 101, 102 or PH 111, 112 ............................................... 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 biology
with emphasis 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 an approved school of medical technology during which time the student
receives lecture and practical laboratory experience in clinical chemistry, hematology,
clinical microscopy, serology, immunohematology, bacteriology, parasitology, and
mycology.
The following curriculum is the NAACLS (National Accrediting Agency for Clinical
Laboratory Sciences) approved curriculum for Medical Technology and 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.

Semester Hours

General Education Requirements (humanities and social sciences) .............. 30-36
Science—BY 113, 114 (or equivalent) and PH 101, 102 .......................... 16
Mathematics (depending upon placement) ........................................... 9
Biology—BY 221, 319, 317, 521, 525, 532, 2 seminars and BY elective ........ 30
Chemistry—121, 123, 125, 126, 223, 331, 332, 335, 361, 362 ................... 21
Clinical (in an accredited school of Medical Tech.) ................................. 29
### Curriculum VIII

**B.S. Degree, Preparatory for Graduate Study in Biology-Mathematics (Biometrics)**

| General Education Requirements (humanities and social sciences) | 30-36 |
| Biology core courses and biology electives | 30-32 |
| Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362 | 21 |
| Mathematics—MA 153, 154, 233, 244, 251, 352 or 353, 385 | 21 |
| Physics—PH 111, 112 | 8 |
| Electives | 14-22 |

### Curriculum IX

**B.S. Degree, Environmental Biology Emphasis, Preparatory for Graduate Study in Ecology or Environmental Science**

| General Education Requirements (humanities and social sciences) | 30-36 |
| Biology—BY 221, 312, 319 | 11 |
| BY 531, 532 | 4 |
| BY Electives: Two from BY 496, 497, 498, 499 | 2 |
| One from BY 378, 371 | 5 |
| Two from BY 561, 564, 565, & 566 | 8 |
| One additional biology course 300 level or above | 4 |
| Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362 | 21 |
| Physics—PH 101 & 102, or 111 & 112 | 8 |
| Mathematics—MA 153, 154, 287 (387 also recommended) | 9 |
| Environmental Sciences—ES 102 | 4 |
| Computer Sciences—CS 113, 208 | 6 |
| Electives | 16 |

### Graduate Program

The biology graduate faculty in cooperation with the biology graduate faculty of Alabama Agricultural and Mechanical University (A&MU) offers courses in biology to satisfy the requirements for a Master of Science degree in Biology with emphasis in cell and developmental biology, ecology, entomology, genetics and molecular biology, microbiology, physiology, and systematics. A minimum of 25% of the biology Course Requirements must be taken at each institution. A student may earn the degree under one of the following three plans:

**Plan I—Master of Science, thesis**
- a. successful completion of an approved program of 24 semester hours
- b. completion of an acceptable thesis
- c. pass a comprehensive final examination

**Plan II—Master of Science, non-thesis**
- a. successful completion of an approved program of 33 semester hours
- b. completion of an acceptable Master’s report (library search, survey or experimentation)
- c. pass a comprehensive final examination
Plan III—Master of Science, education option

a. successful completion of an approved program of 24 semester hours in biology and 9 semester hours in education
b. completion of an acceptable Master's report
c. pass a comprehensive final examination

In addition to fulfilling the general requirements for admission to graduate study, discussed in the section on Graduate Studies, an applicant must:
1. Show competence in an area of Life Science related to the proposed area of study.
2. Have completed one year of chemistry including one term of organic chemistry or biochemistry.
3. Have a minimum grade point average of 2.5 (of a possible 4.0) or 1.5 (of a possible 3.0) in the major area of concentration.

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. Lab Fee: Level 3.

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. Lab Fee: Level 3. Prerequisite: BY 113.

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 aspects. Not open to biology majors. One 2-hour 45-minute lab per week. Lab Fee: Level 4. 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 45-minute labs per week. Lab Fee: Level 4. Prerequisite: BY 113, 114 or equivalent.

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. Lab Fee: Level 4. Prerequisite: BY 113, 114 or equivalent; CH 101 or 121 recommended. Should be taken no later than sophomore year.

230 Cultivate Shrubs and Basic Landscape Principles 2 hrs.
To introduce the basic knowledge in the identification and use of the most widely used shrubs in landscape design for northern and central Alabama. Some attention will be given to herbaceous annuals and perennials. An introduction is included in a basic landscape design. Lab Fee: Level 2. Prerequisite: BY 113 or equivalent.

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 with discussions of the basics of classification techniques and the process of speciation. Field trips required. Lab Fee: Level 2.
312 Principles of Ecology
The basic ecological principles controlling plant and animal populations. Includes the study of the development of ecosystems, communities and habitats. One 3-hour lab per week. Lab Fee: Level 3. Field trips required. Prerequisite: BY 113, 114; CH 121.

315 Ichthyology
Classification, anatomy, physiology, and ecology of freshwater and marine fishes. Emphasis will be placed upon the fishes of North Alabama. Laboratory and field trips required. Lab Fee: Level 3. Prerequisite: BY 114.

317 Vertebrate Zoology
A study of the morphology of vertebrate animals with emphasis upon the relationship of organs and systems and their phylogenetic significance. Two 3-hour labs per week. Lab Fee: Level 4. Prerequisite: BY 114.

319 General Genetics
A study of the hereditary basis of all living organisms, including the structure and function of genes and gene products, reproductive processes, Mendelian principles, and modern genetic techniques and applications. Prerequisites: BY 114 and CH 101 or equivalent.

320 Genetics Laboratory
Practical applications of modern genetic techniques. One 3-hour lab per week. Lab Fee: Level 3. Prerequisite or concomitant: BY 319.

340 Introduction to Cellular and Developmental Biology
A modern approach to embryology. Discussion of selected topics in cell structure and function with respect to mechanisms involved in development. One laboratory per week illustrating selected aspects of cell structure, function and embryogenesis, including organology. Lab Fee: Level 3. Prerequisite: BY 114, 319 and CH 131 recommended. It is strongly recommended that biology majors and pre-professional students take the BY sequence (543, 544, and 545) in Cellular and Developmental Biology in lieu of BY 340.

361 General Biochemistry (same as CH 361)
A detailed study of the molecules that comprise living systems, including their nomenclature structure, properties, and functions in metabolism. Topics of major emphasis will be enzymatic properties, and function; major and minor biosynthetic and catabolic pathways, their interrelations and control mechanisms; glycolysis and gluconeogenesis; Krebs's cycle; photosynthesis, lipids; amino acids and proteins; and nucleic acids. Prerequisites: BY 114, CH 332 and CH 335.

362 General Biochemistry Laboratory (same as CH 362)
Practical experience in the isolation, qualitative identification, and quantitative estimation of biomolecules. One 4-hr. lab per week. Lab Fee: Level 4. Prerequisite or parallel: CH 361.

364 Phytogeography
A study of the floristic provinces of North America, considering the plant species, plant communities and abiotic factors which identify and delimit these provinces, including the basic principles of plant geography, e.g., distribution, range and migration. Where appropriate, examples from other parts of the world will be used to show the universality of the principles involved. Lab Fee: Level 2. Prerequisite: BY 113.

368 Dendrology
A sequel to local flora BY 238, to be offered in alternate years in the winter term. Concerned with the identification of trees and shrubs on the basis of winter twigs, buds & fruits, the dating of trees and climatic patterns by dendro-chronological techniques, the distribution and habitat of local woody Gymnosperms and wood Angiosperms, anatomical characteristics of selected commercial woods, diseases of woody plants and their evolutionary and phylogenetic relationships. Lab Fee: Level 2. Prerequisite: BY 113. Recommended: BY 238.
371 Non-Vascular Cryptogamic Botany
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. Lab Fee: Level 4. Prerequisite: BY 113.

372 Biology of Vascular Plants
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. Lab Fee: Level 4. Prerequisite: BY 113.

378 Invertebrate Zoology
A survey of the Invertebrate Phyla emphasizing anatomy, morphology, embryology, ecology and phylogenetic relationships. Two 3-hour labs per week. Lab Fee: Level 4. Prerequisite: BY 114.

421 Introduction to Medical Microbiology
A survey of the medically significant micro-organisms and their relation to human diseases. Bacterial, fungal, and viral agents will be considered with emphasis on their distribution, properties, pathogenesis and epidemiology. Lab Fee: Level 4. Prerequisite: BY 221.

429 Animal Histology
The microscopic study of the various tissues and organs of the mammalian body. The relationship of structure to the function of the cell and/or organ is stressed. Lab Fee: Level 4. Prerequisite: BY 114 or equivalent.

430 Immunology
A basic course in immunology covering all aspects of this diverse subject. Immunoglobulins, antigens, immune responses complement, immediate and cell mediated hypersensitivities, immunodeficiencies, transplantation and tumor immunology are examples of the areas that will be covered. Lab Fee: Level 4. Prerequisite: Microbiology.

435 Bacterial Physiology and Metabolism
The course will cover all aspects of bacterial physiology such as nutrition and growth of bacteria, the energy mechanisms available to bacteria and how they employ them. The biosynthetic mechanisms of bacteria will also be discussed in detail. Lab Fee: Level 4. Prerequisite: Biochemistry.

436 Physiological Psychology (same as PY 436)
A functional analysis of the neural and endocrine systems underlying behavior. Prerequisite: (either a or b): (a) 15 hrs. of PY or approval of instructor; (b) BY 114 or 213, and 6 hrs. of PY, or, approval of instructor.

455 General Entomology
The study of classification, habits and economic importance of insects including their collection, preservation, and identification. One 3-hour lab per week. Lab Fee: Level 3. Prerequisite: BY 114.

463 Plant Anatomy
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. Lab Fee: Level 4. Prerequisite: BY 372.

464 Plant Speciation & Evolution
Principles of evolution and speciation of flowering plants, to be offered in alternate years. Special emphasis is placed on the nature of plant species, divergence, isolation, and hybridization. Consideration will also be given to the development of classical taxonomy and modern methodology, e.g., numerical taxonomy, chemo taxonomy and cyto taxonomy. One
3-hour laboratory will meet weekly with emphasis on family recognition and relationship utilizing biosystematic laboratory techniques. Field trips required. Lab Fee: Level Prerequisite: BY 113, 319. Recommended: BY 238, Dendrology (BY 368).

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

492 Undergraduate Research 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. Lab Fee: Level 2 for 2 hours, Level 3 for 3 hours, and Level 4 for 4 hours. Prerequisite: approval of instructor.

496, 497, 498, 499 Seminar 1 hr. each 
Discussions of biological literature, careers in biology, graduate schools, and specialty schools. Seniors must take a minimum of two hours. May be taken at the Marine Environmental Sciences Consortium.

Advanced Undergraduate — Graduate Courses:

510 Radiation Biology (A&MU) 4 hrs. 
Characteristics of radioisotopes; detection and counting techniques and instrumentation, tracer techniques; health and safety system. Prerequisite: consult instructor.

521 Clinical Aspects of Microbiology 5 hrs. 
A detailed study of microbiological and immunological principles used for the isolation, characterization, and identification of pathogenic micro-organisms involved in infectious diseases. Laboratory exercises will provide practical experience in diagnostic laboratory procedures. Lab Fee: Level 4. Prerequisite: BY 421, BY 430 or instructor approval.

522 Microbial Physiology (A&MU) 3 hrs. 
The relationship between structure and biochemical functions in micro-organisms. Lab Fee: Level 4. Prerequisites: Microbiology, Organic Chemistry and Biochemistry.

523 Principles of Virology (A&MU) 4 hrs. 
Principles of viral infectivity, multiplication and chemical constitution; includes laboratory techniques for their isolation, cultivation, identification, and enumeration. Prerequisite: Microbiology.

524 Mycology (UAH) 4 hrs. 
A study of the various lines of the Phycymycetes using representative species; the various series of the Actinomycetes; representative pathogenic (crop and vegetative pathogens) and nonpathogenic heterobasidiomycetidae organisms; a study of the various orders and families of the homobasidiomycetidae. Ontogenetics, cellular and structural study applied to all divisions, classes, series, orders and families. Lab Fee: Level 4.

525 Medical Parasitology (UAH) 5 hrs. 
The protozoa and helminths parasitic for man and their laboratory identification are discussed. Arthropods are studied in relation to their roles as vectors. Lab Fee: Level 4. Prerequisite: Microbiology.

526 Microbial Ecology (A&MU) 4 hrs. 
The relationship of soil and aquatic microorganisms and their importance in ammonification, nitrification and other biological processes. Prerequisite: Microbiology.

531 Plant Physiology (UAH) 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. Lab Fee: Level 3. Prerequisite: BY 113, 371, or 372, CH 131 or 331.

532 Animal Physiology (UAH) 4 hrs.
A basic course in organismal function. Lecture topics include membrane physiology with respect to transport phenomena, muscle, nerve, synapse and sensory receptor physiology. The physiology of respiration, heart, circulation, kidney and gastro-intestinal tract are treated as individual systems with emphasis on regulation. One laboratory session per week illustrating physiological principles discussed in lecture. Lab Fee: Level 4. Prerequisites: Senior classification with a major or cluster in biology; 16 hours completed in the AOC and CH 131 or 331 or graduate standing.

533 Medical Physiology I (A&MU) 4 hrs.
Study of nerve and muscle cell function, fluid and electrolyte environment of body tissues, blood, heart, circulatory and nervous systems. Prerequisite: Organic Chemistry, preferably Biochemistry.

534 Medical Physiology II (A&MU) 4 hrs.
A continuation of Mammalian Physiology I with consideration of kidney function, respiratory, digestive, reproductive and endocrine systems. Prerequisite: Medical Physiology I.

535 Advanced Invertebrate Zoology (UAH) 4 hrs.
A study highlighting structural, functional, embryological, and physiological aspects that enable the invertebrates to adapt and survive in their environments. Includes laboratory and field work. Lab Fee: Level 4. Field trips required. Prerequisite: Invertebrate Zoology or approval of instructor.

541 Analytical Biochemistry Laboratory (A&MU) 2 hrs.
An advanced laboratory course dealing with modern techniques of molecular biology and biochemistry.

542 Cell Physiology and Metabolism (UAH) 4 hrs.
A detailed study of the interconversions and functions of biomolecules in cells, including the major metabolic pathways, bioenergetics, interrelations of various pathways and various mechanisms of metabolic regulation. One 3-hour lab per week. Lab Fee: Level 4. Prerequisite: BY/CH 362 and 361 or approval of instructor.

543 Cellular and Developmental Biology (UAH) 3 hrs.
A course designed to provide students of the senior and first year graduate level with a broad and comprehensive integrated approach to cellular and developmental biology through lectures, discussions and selected laboratory experiences. Aspects of cellular structure and function will be coupled with relevant aspects of developmental mechanisms. Lectures will include such topics as mitosis, gametogenesis, nuclear-cytoplasmic interactions, role of genes in cellular and developmental expressions, mechanisms of hormone action on cellular function in development, cell movements and affinities, and selected morphogenesis of germ layer derivatives. Prerequisites: BY 113, 114, 319, CH 101, 105, and 131 or CH 123, 126 and 331 (may be taken concomitantly).

544 Cellular and Developmental Biology (UAH) 3 hrs.
A continuation of BY 543.

545 Cellular and Developmental Biology Laboratory (UAH) 2 hrs.
Should be taken after BY 543 and concurrently with BY 544. Lab Fee: Level 4.

551 Insect Physiology (A&MU) 4 hrs.
Study of metabolism and utilization of carbohydrates, lipids and nitrogen compounds; energy production, neuromuscular mechanisms, hormones and morphogenesis; role of organs and organs system in metabolism. Prerequisite: General Entomology or equivalent, Advanced Biochemistry.
Insect-Pest Management (A&MU) 4 hrs.
Insect surveys, ecological basis for control, plant and animal resistance to insects, control by parasites, predators, microorganisms, management by genetics principles, chemical attractants, chemical repellents, sterilization, insecticides and integrated systems of pest management. Prerequisite: General Entomology or Advanced Applied Entomology.

Insect Taxonomy and Morphology (UAH) 4 hrs.
Classification of insects, external and internal anatomy of insects with emphasis on the comparative and functional aspects. Prerequisite: General Entomology.

Physiological Ecology (UAH) 4 hrs.
The study of the physiological and behavioral responses of organisms to natural changes in their chemical and physical environment. One 3-hour laboratory per week. Lab Fee: Level 3. Prerequisites: BY 312 or approval of instructor. Recommended Animal Physiology or Biochemistry.

Plant Anatomy (UAH-A&MU) 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.

Plant Taxonomy (A&MU) 4 hrs.
A course dealing with the principles of classifying, naming, and identifying vascular plants with special emphasis on flowering plants, including a consideration of ecologic factors influencing vegetational distribution.

Community Ecology (UAH) 4 hrs.
A detailed consideration of ecological principles and concepts, as well as biotic and abiotic factors, relative to the development of plant communities and ecosystems. One 3-hour lab per week. Lab Fee: Level 3. Field trips required. Prerequisite: BY 312 and taxonomy.

Population Ecology (UAH) 4 hrs.
The study of the distribution, population dynamics and behavior of animal populations in relation to environmental factors. One 3-hour lab per week. Lab Fee: Level 3. Field trips required. Prerequisites: BY 312, and organic chemistry.

Limnology (UAH) 5 hrs.
A study of fresh-water environments and organisms exemplified by lakes, ponds, and streams in North Alabama. Includes laboratory and required field trips. Two 3-hour labs per week. Lab Fee: Level 4. Prerequisite: CH 223, BY 221, 371, 378, or approval of instructor.

Pathogenic Bacteriology (UAH) 5 hrs.
A detailed study of bacteria that cause infections in man. Mechanisms of pathogenicity and host-parasite relationships are emphasized. Lab Fee: Level 4. Prerequisites: Medical Microbiology, Immunology, and Biochemistry or approval of instructor.

Applied and Industrial Microbiology (A&MU) 4 hrs.
Examination by microbiological assay of sewage disposal and waste water treatment plants. A study of microorganisms of industrial importance in the biological production of antibiotics, vitamins, organic acids and alcohols is included. Prerequisite: Microbiology.

Advanced Virology (A&MU) 4 hrs.
An outline of the field of virology stressing the molecular biology of virus replication. In keeping with the nature of virology, topics include such diverse subjects as immunology, genetics and epidemiology. Emphasis will be towards bacterial and vertebrate viruses although plant and insect viruses may be discussed. Prerequisite: Microbiology, Principles of Virology.
624 Immunology (UAH)  4 hrs.
Theoretical and practical aspects of immunology. Current areas of immunology that are controversial will be discussed in detail. Lab Fee: Level 4. Prerequisites: Basic courses in Immunology and Biochemistry or approval of instructor.

625 Medical Mycology (UAH)  4 hrs.
A comprehensive study of fungi pathogenic to man with emphasis on their properties, pathogenesis, and laboratory diagnosis. Lab Fee: Level 4. Prerequisite: Microbiology (BY 221).

631 Medical Pharmacology (A&MU)  5 hrs.
A lecture and laboratory course. Major topics include drug-receptor interaction, kinetics of drug absorption, distribution and elimination, and a discussion of drugs affecting different systems. Also to be considered are topics such as pharmacogenetics, toxicity, mutagenesis, teratogenesis, carcinogenesis and drug interactions. Emphasis is on mechanism of action of drugs in relation to their use as therapeutic agents in medicine. Prerequisites: Medical Physiology I and II.

632 Cardiovascular Physiology (A&MU)  3 hrs.
Mechanisms of cardiac muscle excitation and interaction. Analysis of peripheral circulation. Neural regulation of circulation. Angiograph, Electrocardiography, and Vectorcardiography as diagnostic tools. Prerequisites: Medical Physiology I and II.

633 Endocrinology (UAH)  4 hrs.
Anatomy, physiology and biochemistry of the endocrine glands. Discussion of the systemic effects of hormones, their regulation, integration and mechanisms of action. Includes laboratory. Lab Fee: Level 4. Prerequisites: Organic or Biochemistry and Animal Physiology.

641 Advanced Cell Biology (UAH-A&MU)  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. Lab Fee: Level 4. Prerequisite: Cellular and Developmental Biology or approval of instructor.

642 Advanced Cell Physiology (A&MU)  4 hrs.
Biochemical and biophysical cytology. The cell as matter, life history of the cell, molecular basis of cellular activities, enzymes and energy conversions, functional localizations in subunits of the cell, mechanisms of motility, structure and function of cell membranes, effects of radiation on cells, biochemical control mechanisms, cellular differentiation and the interaction between cells, hypotheses of cellular origins. Prerequisites: Molecular Biology, Physics, Cytology, Biochemistry. Includes laboratory.

643 Microscopy (UAH)  4 hrs.
An introduction to the various methods of preparation for transmission electron microscopy and an analysis of electronmicrographs. Attention will also be given to supporting techniques such as phase microscopy, autoradiography, scanning electron microscopy, negative staining, and cytochemistry. Lab Fee: Level 4. Prerequisites: Graduate standing and approval of instructor.

644 Topics in Cell and Developmental Biology and Biological Fine Structure (UAH)  2 hrs.
Discussion of current topics in cell biology with emphasis on student participation. Both plant and animal cells will be emphasized. Depending on the number of students, some terms may be devoted to short research problems. Prerequisite: Cell Biology, Development and Microscopy, or approval of instructor.

645 Human Cytogenetics and Its Clinical Application (A&MU)  3 hrs.
A review of normal human chromosome structure and normal chromosome segregation and morphology with clinical consideration.
646 Molecular Genetics (UAH-A&MU)  4 hrs.
Discusses at an advanced level the molecular mechanisms underlying genetic principles. The following subjects are taken up in coordinated fashion: structure of genes and chromosomes; primary, secondary and tertiary structure of DNA; DNA replication; genetic recombination; RNA transcription; translation and genetic code; regulation of gene function; evolution at the molecular level. Prerequisites: BY 319 and BY-CH 361.

647 Enzymology (UAH)  3 hrs.
A detailed study of enzymes including protein synthesis, the primary, secondary, tertiary, and quaternary structure, nomenclature, physiological and catalytic functions, enzyme kinetics, and metabolic regulations of enzyme activity. Prerequisites: BY 542 or CH 561 or equivalent.

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

651 Medical Entomology (UAH)  4 hrs.
Insects and other arthropods as parasites and disseminators of disease. Mechanism of life cycles, biology, and control of insect parasites of man. Lab Fee: Level 3. Prerequisites: General Entomology and Advanced Biological Chemistry.

Economic thresholds, economic injury levels, population dynamics, residues in food crops, chemical control, insect transmission of plant diseases, and livestock. Prerequisite: General Entomology.

653 Taxonomy of the Immature Insects (UAH)  4 hrs.
Studies of the literature, comparative morphology and techniques of identification of the immature stages of the insects, methods of collecting and preserving the immatures. Prerequisite: General Entomology.

660 Ecosystem Dynamics  4 hrs.
An analytical study of the functional energetics, interrelationships, and adaptive interactions of living organisms in terrestrial aquatic and marine environments. Methodology includes simulations, modeling, field and laboratory experimentation and other predictive and investigational procedures. Lab Fee: Level 3. Field trips required. Prerequisites: BY 564 and BY 565.

663 Advanced Population Ecology (UAH)  4 hrs.
Interaction of population structure, genetic properties and ecology factors in controlling the dynamics and evolutionary character of natural populations. Lab Fee: Level 3. Prerequisite: Principles of Ecology.

664 Advanced Systematic Botany (A&MU)  4 hrs.
Advanced studies in classification, nomenclature, and taxonomic theory of vascular plants. Prerequisite: Plant Taxonomy.

690 Seminar (UAH-A&MU)  1 hr.
Students report on current journal articles.

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

692 Research (UAH-A&MU)  2-4 hrs.
Individual investigations on the graduate level into biological problems under the direct supervision of a member of the graduate faculty. A special problem may be carried out at the Marine Environmental Sciences Consortium, Dauphin Island, Alabama. Available to thesis students.
Master's Thesis (UAH-A&MU)  
Required each term a student is working and receiving direction on his/her master’s thesis. A minimum of two terms is required for M.S. students. A maximum of 9 hours of credit is awarded upon the successful completion of the Master's thesis.

Marine Sciences (MS)

Courses are offered at The Marine Environmental Sciences Consortium Sea Lab at Dauphin Island, Alabama, and may be taken for credit toward a biology major at UAH.

Freshman-Sophomore level courses for non-biology majors:

201 Ocean Science  
An introduction to the marine environment, this course is designed to give beginning college students a full perspective of the major features of the oceanic realm and the relation of oceans to man. Lecture, laboratory, and field work are included. May be used as biology elective.

202 Marine Biology  
A general survey of the invertebrates, vertebrates, and marine plants as communities with emphasis on local examples of these principal groups. Students will have an opportunity to examine marshland, estuarine, beach, dune inlet and neritic habitats, and niches. Lectures, laboratory, and field work will be included. Prerequisites: general biology and consent of instructor. Accepted in biology cluster.

203 Natural History of Commercial Invertebrates  
This course will provide the non-major with a basic understanding of behavior, physiology, development and ecology of commercially important invertebrates. Some prior biology is recommended. Labs and field trips as well as lecture material. May be used as biology elective.

Advanced Undergraduate — Graduate Courses:

500 Environmental Science for High School Teachers  
Designed especially for teachers, but open to upper level undergraduate and graduate students preparing for a teaching career. Basic principles of ecology, techniques of laboratory and field studies, sources and control measures of pollution included.

501 Introduction to Oceanography  
An introduction to the physics, chemistry, biology, and geology of the oceans. This is primarily intended for students at the graduate level, students preparing for graduate school, or those seriously intending to enter the marine sciences professionally. Prerequisites: college algebra, general physics, and general chemistry.

502 Marine Geology  
Included in this course will be sampling techniques, laboratory analysis of sediments, application of the research process to problems in identifying sedimentary environments, topography, sediments, and history of the world oceans. Marine geology is especially beneficial to biology students for an understanding of the sedimentary substrate on or in which a large percentage of marine organisms live. Lecture, laboratory, and field work are included. Prerequisites: physical geology and consent of instructor.

503 Marine Botany  
This course is a general survey of marine algae, vascular and non-vascular plants associated with the marine environment. Distribution, identification, structure, ecology, and reproduction will be considered.

504 Marine Invertebrate Zoology  
A survey, based upon local examples of the principal groups of marine invertebrates with
emphasis on reproduction, distribution, taxonomy, systematics, and ecology. Lecture, laboratory, and field work are included. Students will have ample opportunity to acquire a collection of local fauna. Prerequisites: general biology and consent of instructor.

505 Marine Vertebrate Zoology 4 hrs.
A study of marine fishes, reptiles, and mammals, with an in-depth, comprehensive treatment of their systematics, zoogeography, and ecology. Lectures will encompass subject matter on a non-regional basis. Field and laboratory work will stress the vertebrate fauna of the northern Gulf of Mexico. Most of the course will be devoted to fishes. Students will have an opportunity to assemble a collection of vertebrate species. Prerequisites: general biology and consent of instructor.

506 Marine Zoogeography 4 hrs.
A study of physical, chemical and biological factors influencing the distribution of marine organisms. Emphasis is placed on the importance of continents, open oceans and species competition on animal distribution. Special attention will be given to zoogeographical patterns in the Gulf of Mexico, Western North Atlantic and Caribbean regions. Prerequisite: 12 semester hours of biology.

507 Physiology of Marine Animals 4 hrs.
An introduction to environmental adaptations of marine animals. Emphasis is placed on biochemical, osmotic, respiratory and temperature responses. Both invertebrates and fish are considered. Prerequisites: general biology, general physiology, organic chemistry (biochemistry desirable).

508 Marine Plankton 4 hrs.
A study of physical, chemical and biological factors influencing the distribution of marine organisms. Emphasis will be placed on the Western North Atlantic Ocean.

509 Marine Ecology 4 hrs.
Bioenergetics, community structure, population dynamics, predation, competition, and speciation in marine ecosystems will be studied. Lecture and laboratory work will be included, although considerable time will be spent in field work. Students who have not previously had marine courses may enroll; however, Marine Invertebrate Zoology or Marine Biology would be very helpful. This would be an excellent course for engineers and other nonbiologists interested in the marine environment because individual species will be studies as they relate to ecological principles which they exemplify providing both a taxonomic and ecologic background. Prerequisites: general biology, general chemistry, general physics, and consent of instructor.

510 Marsh Ecology 4 hrs.
This field course is designed primarily for those students who wish to gain a basic understanding of the ecology of a salt marsh. Emphasis will be placed upon habitat analysis, natural history studies and the population dynamics of selected vertebrates. Each student will be assigned a specific field problem that will be terminated by a technical paper. All students will be expected to live at the Point aux Pins Field Station. The student should be physically suited for the rigors of field work and life at a field station. There are no accommodations for families at the Point aux Pins facility. Open to advanced undergraduates and graduate students. Prerequisites: advanced standing in biology and consent of instructor. Attendance of seminar at Sea Lab is required. Maximum enrollment: Six students (both sexes).

511 Benthic Community Structure 4 hrs.
This course will focus on patterns of benthic macro-invertebrate abundance and distribution along the Alabama coastline. Considerable field sampling, taxonomy and data analysis will be included in lectures and labs. Major taxa such as polychaetes and crustaceans will be emphasized. Prerequisites: Invertebrate zoology and consent of instructor.

512 Fisheries Science 4 hrs.
An in-depth study of the principles and methods of marine fishery biology and their applica-
tion to conservation. Lecture and laboratory work are included. Prerequisites: general biology and consent of instructor.

513 Fisheries Economics 4 hrs.
The physical and biological environment of commercial marine organisms and its effect on their distribution and natural fluctuations in abundance. Man’s impact on population through fishing and habitat alteration. Ecology and life history of major groups. Problems of managing the fishery resources through regulation, mariculture, and preservation of specialized habitats. Prerequisite: Consent of instructor.

514 Scientific Data Management 2 hrs.
This course exposes advanced undergraduate students to key techniques and principles in evaluating and expressing experimental data. Includes mapping, profiling, contouring, applied statistics and graphical and tabular representation of results. Does not substitute for basic statistics courses. No prerequisites.

515 Seminar 1 hr.
A discussion of current research, scientific progress, and problems in the marine environment with equal participation by students, faculty, and visiting scientists. Students are not required to enroll in Seminar, but MUST ATTEND TO QUALIFY FOR CREDIT IN ANY OTHER COURSE.

516 Research on Special Topics 1-6 hrs.
Students may enroll by special arrangement in any of the subjects listed. Prerequisite: consent of instructor.

Students should note which term they wish to take special topics in a particular subject. Only Marine Science Program resident faculty will be available for special topics both terms. Other instructors will be available only in the time period listed for their respective courses.

Graduate Course:

601 Oceanology of the Gulf of Mexico 4 hrs.
This course provides a detailed study of the Oceanology of the Gulf of Mexico and adjacent waters. The areas of study will include the coastal zone, continental shelf and deep ocean.

Chemistry

Professors: Arendale, McManus; Associate Professors: Coble, Dodson, Emerson, Harris, Riley (chairman); Assistant Professor: Meehan; Assistant Research Professor: Gregory; Adjunct Associate Professor: Stephens; Adjunct Assistant Professor: Eley.

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 include MA 153, 154, 233, PH 111, 112 plus 2-3 hours of physics in consultation with Chemistry faculty advisor, 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 19 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 27-28 hours of science and mathematics included in Requirement 1 satisfy the science and mathematics General Education Requirements for the B.S. degree.

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 or 113 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 the following general requirements and the options listed under the six curricula headings.

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Requirements (humanities and social sciences) .......... 30-36</td>
</tr>
<tr>
<td>General Education Requirements (science and mathematics) .............. 27-28</td>
</tr>
<tr>
<td>Chemistry (Requirement 2 above) ........................................... 19</td>
</tr>
<tr>
<td><strong>Total hours</strong> .... 76-83</td>
</tr>
</tbody>
</table>

Curriculum I. Premedical Program

The premedical program conforms to the requirements of most medical schools and contains sufficient chemistry to meet the requirements of a chemistry major. Prospective medical students are encouraged to explore their areas of interest outside of the sciences and to strive for maximum scholastic achievement. Students should consult with faculty members early in their college program and should be prepared to take the Medical College Aptitude Test during the spring of their junior year. (An alternative premedical curriculum is included in the Biology section.)

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry Electives (300 level or above) .................................... 6</td>
</tr>
<tr>
<td>Biology—BY 113-114 and one elective ...................................... 12</td>
</tr>
<tr>
<td>Science electives .................................................................... 12</td>
</tr>
<tr>
<td>Other requirements or electives ........................................... 16-23</td>
</tr>
</tbody>
</table>

170
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 requirements in this curriculum.

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester 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 (8-9 hrs.), or Biology (12 hrs.), or Mathematics</td>
<td>9</td>
</tr>
<tr>
<td>Electives</td>
<td>0-1</td>
</tr>
</tbody>
</table>

Curriculum III. Graduate Preparatory Program

ASC 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>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry—CH 337, 343, 346, 401, 521, electives, and a senior project</td>
<td>19</td>
</tr>
<tr>
<td>Mathematics—MA 244, 251, 352</td>
<td>9</td>
</tr>
<tr>
<td>Mathematics or Physics elective</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>14-18</td>
</tr>
</tbody>
</table>

Curriculum IV

General Education Curriculum with a Chemistry Major. Deficiencies may exist with respect to graduate school entrance requirements.

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester 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>22-24</td>
</tr>
</tbody>
</table>

Curriculum V

Chemistry-Physics Program Appropriate for Pregraduate Education.

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester 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—PH 241, 331, 351, one laboratory from 310-312, and one elective</td>
<td>13</td>
</tr>
<tr>
<td>Mathematics—MA 244, 251, 352, and one elective</td>
<td>12</td>
</tr>
<tr>
<td>Electives</td>
<td>5-11</td>
</tr>
</tbody>
</table>
Curriculum VI

Typical Chemistry-Biology Program Appropriate for Pregraduate Education in Biochemistry or for Students Interested in Clinical Chemistry.

In addition to providing sound pregraduate school training for biochemists, this program exceeds the minimum requirements of the American Association of Clinical Chemistry; thus, a person who completes one year of acceptable experience in clinical chemistry subsequent to the B.S. degree may apply for certification as a Clinical Chemical Technologist. Further successful experience may lead to certification as a Clinical Chemist.

**Semester Hours**

<table>
<thead>
<tr>
<th>Course</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>6-9</td>
</tr>
</tbody>
</table>

Minors: Typical chemistry minors which include 6 hours number 300 or above include:

1. CH 121, 125, 123, 126, 223, 331, 332, 333, 335, 336 suggested for premedical and predental students.
2. CH 121, 125, 123, 126, 223, 331, 332, 335, 361, 362 suggested for some biology and medical technology majors.
3. CH 121, 125, 123, 126, 331, 332, 335, 341, 342, 343 suggested for physics and mathematics majors.

**Graduate Program**

A Master of Science degree with a major in chemistry is offered. Additional courses are available. The doctoral degree is awarded through a cooperative program with the Tuscaloosa campus. (See 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.)

**M.S. Degree Requirements**

General requirements of the School of Science and Engineering and the Graduate School under Plan 1 and Plan 2 must be satisfied.

A particular program must be planned in consultation with a member of the chemistry faculty assigned by the Department Chairman as a temporary advisor. When a student following Plan 1 selects his thesis topic, a supervisory committee will be appointed.

**Plan 1** — (1) 24 semester hours of graduate course work, a thesis, and two units of seminar; (2) Reading competence in German or Russian. The faculty may accept other languages under special circumstances. Demonstration of computer machine language or B grades in CS 113 and 208 may also be substituted.

**Plan 2** — Degree requirements for the Master's degree under this plan include the completion of thirty-three or more semester hours of course work. Of the thirty-three
hours, at least twenty-one hours of course work must be in chemistry and up to twelve hours may be in other graduate course work. At least one-half the course work in chemistry and one-half the other course work must be 600-700 level. If the program contains three or more terms of full-time work, the degree requirements may be met with thirty or more semester hours of course work, eighteen of which must be in chemistry. A thesis is not required and a foreign language proficiency is not necessary. A particular program must be planned in consultation with a member of the chemistry faculty assigned by the Department Chairman as a temporary advisor.

All other general and grade requirements are identical with those discussed in the section School of Graduate Studies.

Cooperative Ph.D. Degree Requirements

The Ph.D. requirements of the Graduate School and Chemistry Department of the University of Alabama (Tuscaloosa) must be fulfilled. Please consult the University of Alabama (Tuscaloosa) Graduate Catalogue. The following considerations are made for UAH cooperative students.

1. Only 2 semesters of residency required in Tuscaloosa.
2. Cumulative examinations may be taken at UAH.
3. Research may be done at UAH.
4. One or two UAH chemistry faculty members may serve on the dissertation committee.

Chemistry (CH)

101 Introduction to Chemistry 3 hrs.

An introduction is presented to the properties of solids, liquids, gases, and solutions, to atomic theory and bonding, concentration concepts, and to the physical and chemical properties of the more common elements and their compounds. CH 101 may not be counted in a chemistry major or minor. Chemistry majors or minors taking CH 101 receive elective credit only. CH 101 may be utilized in conjunction with CH 105 and CH 113 to fulfill the laboratory science requirement. No placement examination is required for enrollment in CH 101. A student may opt to take CH 101 even if a satisfactory score on the placement examination for enrollment in CH 121 is attained. Prerequisite: MA 104 or 105 or mathematics placement at Level II. Parallel: CH 105.

105 Introductory Chemistry Laboratory 1 hr.

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. CH 105 may not be counted in a chemistry major or minor. Chemistry majors or minors receive elective credit only. Parallel: CH 101. Lab Fee: Level 3.

113 Elementary Organic Chemistry 4 hrs.

An extension of CH 101 for those students desiring an understanding of the broad concepts of organic chemistry. Recommended for Nursing majors, and as a sequel to CH 101 and 105 for the 8 hour laboratory science for non-science majors. Not open to chemistry majors. Includes laboratory. Lab Fee: Level 3. Prerequisite: CH 101, 105; equivalent or placement examination.

121 General 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 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.

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

125 General Chemistry Laboratory 1 hr.
Laboratory work which complements the lecture material for CH 121. Parallel: CH 121. Lab Fee: Level 3.

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 complex ions and compounds. Lab Fee: Level 3.

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. Lab Fee: Level 4. Prerequisite: CH 126.

301 Elementary Biochemistry 3 hrs.
A general survey course in biological chemistry for students in a variety of disciplines. Topics of major emphasis will be enzyme function and major metabolic processes, their interrelations, and control such as photosynthesis, respiration, nucleic acids and protein synthesis, lipid metabolism and membranes. Topics of general interest in molecular physiology such as metabolic diseases and blood proteins will also be included. Prerequisites: BY 114 and CH 131 or 123. No credit given to chemistry majors and credit in CH 361 precludes credit in CH 301.

331 Organic Chemistry 3 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 Organic Chemistry 2 hrs.
Continuation of CH 331. Prerequisite: CH 331.

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

335 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. Lab Fee: Level 3. Prerequisite or Parallel: CH 331.

336 Organic Chemistry Laboratory II 1 hr.
Continuation of CH 335. Lab Fee: Level 4. Prerequisite: CH 335. Prerequisite or Parallel: CH 332.

337 Organic Chemistry Laboratory III 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. Lab Fee: Level 4. 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 113 or 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, or permission of the instructor.

345 Experimental Physical Chemistry I 1 hr.
Laboratory investigations into the general area of thermodynamics. Lab Fee: Level 4. Prerequisite: CH 341.

346 Experimental Physical Chemistry II 1 hr.
Laboratory investigations into the general area of kinetics and spectroscopy. Lab Fee: Level 4. Prerequisite: CH 345. Parallel: CH 343.

361 General Biochemistry (same as BY 361) 3 hrs.
A detailed study of the molecules that comprise living systems, including their nomenclature, structure, properties, and functions in metabolism. Topics of major emphasis will be: enzymatic properties and function; major and minor biosynthetic and catabolic pathways, their interrelations and control mechanisms; glycolysis and gluconeogenesis; Kreb's cycle; photosynthesis, lipids; amino acids and proteins; and nucleic acids. Prerequisites: BY 114, CH 332 and CH 335.

362 General Biochemistry Laboratory (same as BY 362) 1 hr.
Practical experience in the isolation, qualitative identification, and quantitative estimation of biomolecules. One 4-hr. lab per week. Lab Fee: Level 4. Prerequisite or parallel: CH 361.

401 Inorganic Chemistry 3 hrs.
A survey of certain fundamental topics in inorganic chemistry, including atomic structure, chemical bonding, periodic relationships, acid-base theories, nonaqueous solvents, and reaction mechanisms. Prerequisite or parallel: CH 342.

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 utilized last digit of course number to designate semester hour credit. Student normally may elect only up to six hours. Lab Fee: Level 4 excluding CH 491.

506 Radioisotope Techniques 3 hrs.
Lecture and laboratory course. Radioactivity decay, measurement and production. Applications of radioisotopes to chemical and biological phenomena. Lab Fee: Level 4. 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. Lab Fee: Level 4. Prerequisite: CH 346.

525 Environmental Chemistry 3 hrs.
Principles of quantitative analyses related to the minor components of a sample. Applications will be selected from the principal analyses necessary to maintaining environmental quality of air, water, and soil. Emphasis will be placed on selection of conditions for collecting reliable
samples; concentration of components with techniques for increasing concentration of selected component; relationships between physical and chemical changes in the sample and the signal output of the predominant transducers; and the translation of the chemical analysis into meaningful specifications. Lecture only. Prerequisite: CH 521; or CH 122 or 123; EG 311, 342.

531 Physical Organic Chemistry 3 hrs.
An introduction to theoretical organic chemistry. Topics stressed include bonding, methods for determining reaction mechanisms, reactive intermediates, and stereochemistry. Prerequisite: CH 333, 343, or approval of instructor.

540 High Polymer Chemistry 3 hrs.
The theory of polymer formation and the structural dependence of polymer properties are discussed. Prerequisite: CH 337, 342.

549 Spectroscopy and Molecular Structure 3 hrs.
An intermediate level treatment of the principles of spectroscopy and their application to the determination of molecular structure. Prerequisite: CH 343.

553 Introductory Quantum Mechanics I 3 hrs.
Same as PH 551. Prerequisite: CH 343, PH 351; MA 224, 251, 352.

554 Introductory Quantum Mechanics II 3 hrs.
Same as PH 552. Prerequisite: CH 553.

561 Molecular Biochemistry 3 hrs.
Structural chemistry and function of biomolecules, mechanisms of biochemical reactions, enzyme kinetics, energy transfer, metabolism and biological control mechanisms. Prerequisites: CH 333, 342, and BY 114.

600 Advanced Inorganic Chemistry 3 hrs.
A survey course with emphasis on the structure and reactivity of inorganic compounds. Prerequisite: CH 401.

601 Structural Methods in Inorganic Chemistry 3 hrs.
The study of various physical methods applied to the determination of the structure of inorganic compounds. Prerequisite: CH 600.

602 Chemistry of Coordination Compounds 3 hrs.
Modern bonding theory and stereochemistry of coordination compounds will be presented. Prerequisite: CH 600.

603 Chemistry of Non-Metal Compounds 3 hrs.
A study of the chemistry of selected non-metal compounds. Prerequisite: CH 601.

621 Methods of Chemical Analysis 3 hrs.
A literature, seminar course which emphasizes the theory and methodology of various techniques of chemical analysis. Prerequisite: CH 521.

631 Advanced Organic Chemistry I 3 hrs.
A systematic study of the reaction mechanism of various types of organic compounds. Prerequisite: CH 531.

632 Advanced Organic Chemistry II 3 hrs.
A course which is complementary to previous courses and treats special classes of compounds and natural products.

633 Synthetic Organic Chemistry 3 hrs.
A study of the reactions and principles involved in the synthesis of simple and complex organic compounds. Prerequisite: CH 632.
Advanced Chemical Thermodynamics 3 hrs.
 Presents a thorough treatment of the first, second, and third laws of thermodynamics and applications. Includes a brief introduction to statistical thermodynamics. Prerequisite: CH 343, MA 251, or approval of instructor.

Statistical Thermodynamics 3 hrs.
 A discussion of principles leading to the development of Maxwell-Boltzmann, Bose-Einstein, and Ferm-Dirac statistics is presented and thermodynamic properties are calculated from the partition function. Prerequisite: CH 640.

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.

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.

Selected Topics in Inorganic Chemistry 3 hrs.
 Prerequisite: CH 600.

Selected Topics in Organic Chemistry 3 hrs.
 Prerequisite: CH 633.

Selected Topics in Physical Chemistry 3 hrs.
 Prerequisite: CH 643.

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

Master's Thesis 3 or 6 hrs.
 Required each term a student is working and receiving direction on his master’s thesis. A minimum of two terms required for M.S. students.

Doctoral Dissertation 3, 6, or 9 hrs.
 Required each term a student is working and receiving direction on his doctoral dissertation.

Natural Science

The Natural Science sequence (12 semester hours) is an integrated science program designed specifically for liberal arts (non-science) majors. Contemporary aspects of science are used as a framework for introducing basic scientific concepts in a manner more appropriate for non-science students. Fundamental ideas of chemistry, physics, and biology are treated so as to minimize the distinction between the three disciplines. Study in this program is directed toward conveying the impact of science on the individual's life and teaching students to apply general, but sound, scientific logic to arrive at reasonable conclusions about scientific and technological questions. Stressed throughout the three terms are: (1) the interaction of science with social, economic, and political forces; (2) the strengths and limitations of science and technology; and (3) an understanding of science as a human endeavor. The laboratory (necessary for any sound basic science program) is used to encourage students to become aware of modern-day problems and to illustrate the need for careful, experimental investigation of technical problems in the spirit of the scientific method.

The Natural Science sequence may be used to fulfill the University's general education science requirements and it also satisfies the physical and biological science requirement.
for teacher certification. The maximum benefit will be obtained when the three terms are taken sequentially because of the integrated nature of the program. However, the courses may be taken out of sequence and any individual course may be taken as an elective. The program is open to undergraduates at all levels.

Natural Science (NS)

111 Ecological Awareness. Includes laboratory 4 hrs.
A presentation of scientific nomenclature, ecosystems, cycles, environmental problems, population and control, resource depletion, food production, nutrition and additives, social and political issues, and economics as related to the ecological crisis. Lab Fee: Level 3. Prerequisite: Level I placement in mathematics (1 year of high school algebra).

112 Physical Science and Society. Includes laboratory 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. Lab Fee: Level 3. Prerequisite: Level I placement in mathematics.

113 Human Awareness. Includes laboratory 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. Lab Fee: Level 3. Prerequisite: Level I placement in mathematics.

Computer Science

Assistant Professors: Hsia (chairman), Johannes, Petry.

Courses in computer science are offered to satisfy the requirements of a minor or cognate studies in the undergraduate program and to satisfy approved specializations in the graduate program.

The following list is typical of cluster of courses chosen by students:

Undergraduate—CS 113, 208, 214, 308 and one of the following options
(a) CS 311, 411, 513, 517, 524 or 530
(b) CS 309, 415, 513, 517, 520 or 530

Graduate—CS 511 and one of the following options
(a) CS 513 or 690
(b) CS 513, 517, 520, 524, 530, 612 or 690
(c) CS 603, 703
(d) CS 517, 524, 603, 612

Graduate Program

The computer science graduate faculty offers courses in computer science to satisfy the requirements for a Master of Science degree in Computer Science with emphasis in programming languages, software systems, and mathematical foundations.

The M.S. degree program is designed primarily for graduate students with undergraduate degrees in areas other than computer science. The purpose of the program is to prepare the student for advanced research work in computer science or to serve as a terminal degree for those who wish to enter industry or government service. Computer science is characterized by the sciences and technologies developed to utilize computers
and its application to aid human society.

Admission to the Program—The requirements for admission to this program conform to the policies of the Graduate School of the University. In addition, the following prerequisites are required: (1) Mathematics, 12 hours beyond college algebra including a minimum of 3 hours of logic or abstract algebra (CS 214, MA 242, or equivalent); (2) Working knowledge of a high-level programming language (CS 113 or equivalent) and an assembly programming language (CS 308, CS 511, or equivalent). For students who do not meet the above requirements, probationary admission may be granted on the recommendation of the chairman of the computer science program.

A minimum score of 500 on the quantitative portion of the aptitude test of the Graduate Record Examination (GRE) is also required for unconditional admission. The advanced portion of the GRE is not required.

Degree Requirements—The Master of Science degree will be conferred on those students who satisfy all degree requirements of the Graduate School under either Plan I or Plan II and the following:

1. Courses numbered between 500 and 599 may be taken for graduate credit with prior approval of such courses on the student's plan of study. (Please note that any student who is required to take CS 511 as a prerequisite should understand that this course will not count toward minimum degree requirements.) The student must attain a minimum grade of "B" in each course designated by a number less than 600 to receive credit toward a master's degree in Computer Science; otherwise, a substitution of another approved course will be necessary.

2. All courses are selected by the student with the counsel of his advisor and are subject to approval by the chairman of the computer science program, the dean of the School of Science and Engineering, and the dean of the School of Graduate Studies.

Additional course work may be required to remove deficiencies in undergraduate studies (e.g., to acquire a working knowledge of a computer language).

A particular program must be planned in consultation with a member of the computer science faculty assigned by the program chairman as a temporary advisor. When a student following Plan I selects his thesis topic, a supervisory committee will be appointed.

Plan I. A minimum of 24 semester hours of course work and the writing of an acceptable thesis must be completed. The course work must include: (a) 15 to 18 semester hours of graduate credit in the core and major electives; (b) 6 to 9 hours of courses in an approved minor area. Passing a comprehensive final examination is required.

Plan II. A minimum of 33 semester hours (30 for students with three or more terms of full-time work) must be completed and must include: (a) 18 to 21 semester hours of graduate credit courses in the core and major electives; (b) 12 to 15 semester hours of courses in an approved minor area. Passing a comprehensive final examination is required.

Core Courses—All students are required to take the following three courses: CS 517, Data Structures; CS 524, Programming Languages; and CS 690, Operating Systems.

Major Electives
EG 502 Logic Circuits
EG 503 Analog and Hybrid Simulation
EG 506 Communication Theory
CS 513 Digital Computer Systems
MA 515 Numerical Methods in Analysis
CS 520 Computer Related Mathematics
EG 527 Systems Simulation
CS 530 Artificial Intelligence
MA 544 Linear Algebra
MA 585 Probability
EG 602 Digital Computer Design
CS 603 Formal Languages & Mathematical Machine Theory
EG 606 Statistical Communication Theory
EG 607 Information Theory
EG 621 Statistical Methods for Engineers
EG 631 Management Information Systems
EG 702 Theory of Automata
CS 703 Theory of Programming Languages

Approved Minor Areas
Administrative Science
Computer Engineering
Control Sciences
Economics
Management Applications
Mathematics
Operations Research
Statistics with Application

Other appropriate minors may be approved by the chairman of the computer science program.

Computer Science (CS)

100 Basic Computers and Computing 3 hrs.
History of computation and the computer revolution. Introduction to a computer; the overall structure of a computer; problem solving and how to construct computer solutions. Influence of computers: Impact of computers on the individual and modern society; applications of computers in business, medicine, humanities, etc. Lab Fee: Level 1.

113 Introduction to Computing 3 hrs.
Introduction to the concept of an algorithm; basic components of algorithms such as assignment, conditional branching, and input/output; basic algorithmic processes such as sorting, searching, table look-up and iterative procedures; representation of algorithms in the form of flow charts and computer programs; components and basic capabilities of computer systems; the programming language ANSI FORTRAN and computer experience in the use of this language in the solution of both numerical and non-numerical problems; definition and use of functions and subroutines. No credit to student who has completed EG 196. Lab Fee: Level 2. Prerequisite: MA 105 or Level II placement in mathematics.

208 Computer Organization and Software Systems I 3 hrs.
Computer hardware organization; representation of numbers and characters, memory and memory addressing techniques, functions of central processing and control units, instruction representation and execution. Computer software systems: loaders, assemblers, third generation programming concepts including subroutines, recursive code and reentrant code, and macros; study of the organization of the University's computer and its assembly language; programming experience in an assembly language. Includes laboratory. Lab Fee: Level 2. Prerequisite: CS 113 or EG 196.

211 Introduction to Computers in Business 3 hrs.
Information processing and computer fundamentals; computer systems, programming planning, and introductory COBOL programming; design and implementation of computer-based information systems. Lab Fee: Level 1. Prerequisite: CS 100 or CS 113.
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 and either MA 133 or Level III placement in mathematics.

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. Lab Fee: Level 2. Prerequisite: CS 208.

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 and CS 113 or EG 196. Same as EG 309.

310 Introduction to Business Data Processing
Overview of COBOL; advanced COBOL features; RPG; control language and associated file handling (random and indexed sequential); table handling and hierarchical data structures; management of computers—documentation and maintenance. Lab Fee: Level 2. Prerequisite: CS 211 or CS 308.

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. Lab Fee: Level 3. Prerequisite: CS 308.

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. Lab Fee: Level 4. Prerequisite: CS 311 or CS 310.

415 Introduction to Digital Computer Design
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 or permission of instructor. Same as EG 415.

511 Assembly Language Programming*
Assembly language programming in fixed wordlength computers; techniques in addressing and machine control; data structures and data processing; use of subroutine linkages; coroutines, pushdown lists, list processing, recursions and input-output subroutines; use of a macro-assembly language; study of the organization and architecture of the University's computer and its assembly language. Not open to students who have taken CS 308. Prerequisite: CS 113 or EG 196. Same as EG 511.

*If the course taught used a computer system other than the system currently used on the University campus, students completing this course must acquire proficiency in using the University's computer before taking any other CS course which requires CS 511 as a prerequisite.

513 Digital Computer Systems
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.

517 Data Structures
Basic concept of data. Linear lists, sublists, strings, arrays, trees, queues, and stacks. Storage systems and structures, and storage allocation and collection. Efficient algorithms for creating, sorting, merging, searching, structured data. Formal specification of data structures, data structures in programming languages, and generalized data management systems. Prerequisite: CS 308 or CS 511 or approval of instructor. Same as EG 517.

520 Computer Related Mathematics
Classification of numerical errors; propagation of errors; algorithms for computing roots of polynomials with error analysis; propositional logic, graph theory, predicate calculus and their relationship to program analysis; regular expressions and their applications to various areas of computer science. Prerequisite: CS 214 or equivalent or approval of instructor.

524 Programming Languages
Definition and classification of programming languages; concepts, design and use of languages, such as block-structured, string-processing, and list-processing languages; unified approach to general purpose languages; comparative analysis between languages; recent developments; syntax, semantics and pragmatics. Prerequisite: CS 511 or equivalent.

530 Artificial Intelligence
Study of basic methodologies and techniques; heuristic search, modeling and representation of knowledge, deduction and problem solving, languages and system. Study of some application areas: automatic programming, robots, machine vision, natural language systems, automatic theorem proving, game playing, information processing psychology. Prerequisite: CS 511 or equivalent or approval of instructor.

603 Formal Languages and Mathematical Machine Theory
Formal definition of programming languages including specification of syntax and semantics. Definition of formal grammars finite-state, context-free and context-sensitive grammars. Definition of mathematical machines finite-state, pushdown, linear bounded automata. Relationship between formal languages and automata. Prerequisite: CS 214 or approval of instructor.

612 Compiler Construction and Writing Systems
Review of programming language structures, translation, loading, execution, and storage allocation. Compilation of simple expression and statements; organization of a compiler including compile-time and run-time symbol tables, lexical scan, syntax scan, object code generation, error diagnostics. Extensive use of compiler writing system in classroom projects to construct compilers for programming languages. Prerequisite: CS 517 and CS 524.

680-689 Selected Topics in Computer Science
The purpose of this course is to enable the computer science program to comply with requests for courses in special topics. Prerequisite: Approval of instructor.

690 Operating Systems
Techniques of constructing operating system control programs including management of system, jobs, and data; multiprogramming, multiprocesssoring, and timesharing systems. Prerequisites: CS 517. Same as EG 690.

699 Master's Thesis
Required each term a student is working and receiving direction on his Master's Thesis. A minimum of two terms is required. A maximum of 9 hours of credit is awarded upon successful completion of the Master's Thesis.
Theory of Programming Languages

Syntactic analysis and semantic interpretation of formal languages and the association compiler techniques as utilized in current procedure oriented compilers. Prerequisite: CS 603. Same as EG 703.

Environmental Sciences

Associate Professor: Adams (chairman); Assistant Professors: Lewis, Modlin; other faculty members of Biology, Chemistry, Engineering, Mathematics, Computer Science, and Physics; Adjunct Professor: Essenwanger; Adjunct Assistant Professor: Schroer; Adjunct Instructor: Carter.

Environmental Science courses are taken for several purposes: as science electives which satisfy general education requirements, to build an Area of Concentration (AOC) Cluster, and to earn an Environmental Science Certificate. The Certificate Program is designed to prepare scientists, mathematicians and engineers for solving problems relating to man's interaction with the natural environment. The Certificate is a supplement to the bachelor's, master's, or doctor's diploma and signifies that the holder has broadened his perception of the physical and organic environment by studying the entire spectrum of natural science (atmosphere, biosphere, hydrosphere, and lithosphere), and by specializing in the environmental aspects of his chosen field.

Many of the courses necessary to earn the Certificate are automatically taken as part of the student's AOC major or his general education requirements. Other required courses can be taken as electives, permitting the fully prepared bachelor's candidate to complete requirements for his degree plus the Certificate within the usual number of credit hours required for the bachelor's degree alone.

Requirements for the Environmental Science Certificate

Basic Science Courses (unless exempted by advanced placement and/or testing in each case): Biology 113, 114; Chemistry 121, 123, 125, 126; Environmental Science 101, 102; Physics 101, 102; Two basic courses in Statistics and/or Computer Science.

Environmental Core Courses:
BY 312 Principles of Ecology
ES 303 Environmental Climatology (or ES 304 Environmental Meteorology)
ES 311 Environmental Geology and Hydrology
ES 321 Pollution Problems

Advanced Level Specialization (six hours required in courses in the student's major, or area of interest chosen from the following):
BY 526 Microbial Ecology
BY 561 Physiological Ecology
BY 564 Community Ecology
BY 565 Population Ecology
BY 566 Limnology
MS 502 Marine Geology
MS 509 Marine Ecology
MS 510 Marsh Ecology
CH 525 Environmental Chemistry
EG 422 Systems Analysis
EG 427  Management Science
EG 524  Introduction to Human Engineering
EG 542  Environmental Engineering
EG 559  Selected Topics in Mechanical Engineering
ES 304  Environmental Meteorology
ES 490  Special Topics in Environmental Science
ES 492  Special Topics in Environmental Science
ES 521  Environmental Data Analysis

Requirements for a Minor in Environmental Science

Students in any area of study can, with approval of the advisor in their department, build a minor in Environmental Science. The minor is tailored to the student's needs through consultation with the department advisor and the Environmental Science Committee chairman.

Environmental Science (ES)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Planetary and Atmospheric Science</td>
<td>4 hrs.</td>
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<tr>
<td></td>
<td>Spatial relationships of the earth, moon, and sun</td>
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<td>determine the figure of the earth, earth</td>
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<td>motions, time, seasons, atmospheric and</td>
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<td>oceanic circulation, weather, and climates.</td>
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<td>Includes practical and field work. Lab Fee:</td>
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<td>Level 2.</td>
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<tr>
<td>102</td>
<td>Physical Geology</td>
<td>4 hrs.</td>
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<td></td>
<td>Nature and evolution of the earth's continents</td>
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<td>and ocean basins; includes rocks and minerals;</td>
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<td></td>
<td>landscape formation by rock weathering, surface</td>
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<td>and ground water, volcanoes and related</td>
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<td>igneous activity, glaciers, wind, ocean current</td>
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<td>s and waves; crustal deformation and balance;</td>
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<td>continental drift; earthquakes, interior</td>
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<td></td>
<td>heat, gravity, and magnetism. Lunar and planetary</td>
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<td></td>
<td>geology. Includes laboratory and field work. Lab</td>
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<td>Fee: Level 2.</td>
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<tr>
<td>303</td>
<td>Environmental Climatology</td>
<td>3 hrs.</td>
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<td></td>
<td>Classification definition of types of climate;</td>
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<td>processes of atmospheric dispersions —turbulent</td>
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<td>transfer and diffusion; environmental alterations</td>
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<td>by man; climate/ecology relationships. Prerequisite:</td>
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<td>ES 101, MA 105 or approval of instructor.</td>
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<tr>
<td>304</td>
<td>Environmental Meteorology</td>
<td>3 hrs.</td>
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<td>Physical properties and dynamics of the</td>
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<td>atmosphere; factors that govern weather</td>
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<td>conditions; meteorological factors affecting</td>
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<td>the design and operation of aircraft; weather</td>
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<td>research. Prerequisite: ES 101, MA 154 or</td>
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<td>approval of instructor.</td>
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<tr>
<td>311</td>
<td>Environmental Geology and Hydrology</td>
<td>3 hrs.</td>
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<td></td>
<td>Study and evaluation of the geologic and</td>
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<td>hydrologic constraints on land use. Includes</td>
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<td>considerations of influence of topography;</td>
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<td></td>
<td>energy, mineral, soil, and water resources; and,</td>
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<td>geologic and hydrologic hazards. Fundamentals of</td>
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<td></td>
<td>hydrology. Prerequisite: ES 102 or permission of</td>
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<td>the instructor.</td>
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<tr>
<td>321</td>
<td>Pollution Problems</td>
<td>3 hrs.</td>
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<td>Quantitative descriptions of environmental</td>
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<td>conditions, regulations, and abatement</td>
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<td></td>
<td>technology; specific pollution problems with air,</td>
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<td>water, noise, and radiation; assessment of</td>
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<td></td>
<td>environmental impacts of development or</td>
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<td>construction projects. Prerequisites: sophomore</td>
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<td></td>
<td>standing and approval of instructor.</td>
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<tr>
<td>490</td>
<td>Special Topics in Environmental Science</td>
<td>1-4 hrs.</td>
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<td>A literature search and summarization with regard</td>
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<td>to topics of interest, conducted under the</td>
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<td>direct supervision of an instructor. Prerequisite:</td>
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<td></td>
<td>approval of instructor.</td>
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</tbody>
</table>
Special Projects in Environmental Science 1-4 hrs.
Individual investigations of environmental problems under the direct supervision of an instructor. Prerequisite: approval of instructor. Lab Fee: Level 4.

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

Professors: Doss, Gibson; Associate Professors: Casazza, Cook (chairman), Forte, Hoormani, Roach; Assistant Professors: Chang, Pengra; Instructors: Blackwelder, Cothran, James, King; Adjunct Professor: Lehnigk.

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 minor 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 502 (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, 244, 333, 350, 385, 442 and two approved MA courses numbered above 200.

Students majoring in other academic areas may include only MA courses numbered above 150 in their AOC. A typical mathematics minor consists of MA 153, 154, 233, 244, 251 and two approved MA courses numbered above 300. All MA minors must include MA 153 and 154.

No student may enroll in his first MA course at UAH 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 105 (or 104), 143, 151, 244, 333, 350, 385, beginning with the course indicated by their placement level.

Students who may continue in mathematics and need 3 to 9 hours to satisfy General Education Requirements should make their choice from the sequence MA 119, 121, 153, 154, 233, 244, beginning with the course indicated by their placement level.

Students with various placement levels must begin their MA courses for credit as follows: Level I—MA 104 or 105 or 119; Level II—MA 121 or 143; Level III—MA 151 or 153.

The following 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>General Education Requirements:</th>
</tr>
</thead>
<tbody>
<tr>
<td>English and History ............... 18</td>
</tr>
<tr>
<td>Language (French, German or Russian recommended) .... 6-12</td>
</tr>
<tr>
<td>Social Sciences ................. 6</td>
</tr>
<tr>
<td>Mathematics (courses numbered below 150) ........ 0-6</td>
</tr>
<tr>
<td>Laboratory Science ............ 0-16</td>
</tr>
</tbody>
</table>

[NOTE: Math majors taking Physics courses must choose from the sequence PH 111, PH 112, PH 113.]

For B.A. .......................... 8 hours in one science or a science cluster
For B.S. .......................... 8 hours in Physics and 8 hours in Biology or Chemistry

Mathematics Major (minimum requirements):
MA Basic Core, MA 352, and MA 551 .............................. 27
MA Electives (must be preapproved by student's mathematics advisor; must be at 300-level or above; must include at least one 500-level course) .................................. 9

[NOTE: MA 570 is recommended for students preparing for graduate study in mathematics.]

Minor (see examples below) ......................... 21-24
Electives (to 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.

<table>
<thead>
<tr>
<th>General Education Requirements:</th>
</tr>
</thead>
<tbody>
<tr>
<td>English, History, Speech and Psychology ................. 24</td>
</tr>
<tr>
<td>Language (French, German, or Russian recommended) .... 6-12</td>
</tr>
<tr>
<td>Social Sciences (Economics, Political Science, or Sociology) .... 6</td>
</tr>
<tr>
<td>Mathematics (courses numbered below 150) ........ 0-6</td>
</tr>
<tr>
<td>Science .................................. 4-16</td>
</tr>
</tbody>
</table>

[NOTE: Math majors taking Physics courses must choose from the sequence PH 111, PH 112, PH 113.]

For B.A., one of the following options:
(a) 4 hours in a Biological Science with a Physical Science minor
(b) 4 hours in a Physical Science with a Biological Science minor
(c) 4 hours in a Biological Science and 8 hours in a Physical Science
(d) 4 hours in a Physical Science and 8 hours in a Biological Science

For B.S. .......................... 8 hours in Physics and 8 hours in Biology

[NOTE: Teacher Certification requires at least 4 hours in a Biological Science in the student's program.]

Professional Education Courses:
ED 261, 263, 388, 490, 497 .......................... 21
Mathematics Major (minimum requirements):
MA Basic Core, MA 333, and MA 385 or 585 ........................................ 27
MA Electives (must have prior approval of student’s mathematics advisor;
must be at 300-level or above; must include at least one 500-level
course) .................................................................................. 6
Minor (see examples below) ..................................................... 21-24
Electives (to bring total number of semester hours to 128) ............. 0-9

[NOTE: Unless carefully planned this curriculum may require more than the minimal total of 128 semester hours. Students pursuing
this curriculum should consult their advisor early in their program.]

Curriculum III

B.A. or B.S. Degree with a Major in Mathematics Education; meets Requirements for
the Professional Elementary Education Curriculum.

Semester Hours

General Education Requirements:
As in Curriculum II ................................................................. 48-64
Additional Humanities (ART 215, MU 215, ED 215) ....................... 9
Additional Social Sciences (see PEEC Requirements) .................... 6

Mathematics (minimum requirements):
MA 153, 154, 244, 333, 350, 385, 442, and two MA electives 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 minors are typical of minors chosen by students who major in
mathematics. Students who feel that substitutions can produce a program better suited
for their needs are encouraged to consult their faculty advisor about the feasibility of such
substitutions.

(a) Biology—BY 113, 114, and 13 hours of BY courses with at least six of these hours
in courses numbered 300 or above.
(b) Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 333, 335, 336, 341.
(c) Physics—PH 111, 112, 113, 201, 241, 331, 351.
(d) Economics—EC 142, 143, 340, 341, 345, 448, and ST 287.
(e) Operations Research—CS 113, EG 220, 390, 421, 525, 527, and 522 or 526.
(f) Industrial Engineering—EG 220, 321, 390, 421, 524, 525, and 523 or 526.
(g) Computer Science—CS 113, 208, 214, 308, and any 9 hours from one of the
following options: CS 311, 411, 513, 517, (interest in business or economics); CS 309, 415,
513, 517 (interest in systems design and analysis).
(h) A minor 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.

[NOTE: Students who expect to pursue graduate study in applied mathematics are urged to select a minor in science or engineering.]

**Graduate Programs**

The mathematics graduate faculty offers courses in mathematics (MA) and statistics (ST) to satisfy the requirements for an M.A. degree in mathematics and to satisfy individual needs for courses to supplement other areas of study. The Ph.D. degree in mathematics can be obtained through a cooperative program with the Tuscaloosa campus. (Interested students should contact the Chairman of the Department of Mathematics.)

In addition to fulfilling the Graduate School requirements, each student's program (except in the options noted below) must include MA 642, 653, 656, and 671 and one of the following:

(a) An approved thesis and 12 hours of electives which must be selected so that the program includes an approved 6 hour sequence; or

(b) 21 hours of approved electives including any two of MA 644, 670, 743, 754, 756.

With prior approval of the student's graduate advisor, a student may instead choose a program with emphasis in probability and mathematical statistics. The requirements for this option are “a,” “b,” and “c” below.

(a) MA 544, 585, 653, 656, 685, and ST 687.

(b) MA 754, 785; or ST 787 and 3 hours of approved electives;

(c) An approved thesis or 9 hours of approved electives.

With prior approval of the Department of Mathematics, a student may choose a program leading toward the Class A Secondary Professional Certificate. This option is primarily for secondary school teachers. The requirements include 24 hours of mathematics and nine hours of education, all at the graduate level. Students interested in this option should contact the Chairman of the Department of Mathematics as soon as possible since it requires careful planning of the program to meet all requirements.

Normally, no more than 6 hours of non-MA courses are applicable to the M.A. degree in mathematics. Students choosing the thesis option may include at most 9 hours from 500-level courses. Students who choose the non-thesis option may include at most 12 hours from 500-level courses. In all cases, all 500-level courses and all electives must receive prior approval of the student's advisor.

In addition to fulfilling the Graduate School requirements, all applicants for graduate study in mathematics should have completed the equivalent of MA 153, 154, 233, 244, 251, 442, 502, 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 on 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 the aptitude portion of the examination. Each applicant must:

(a) Have a minimum overall undergraduate quality-point average of at least 2.0 (A=3.0), or at least 2.0 for the last 60 hours of work, and

(b) Score at least 1,000 on the aptitude portion of the GRE.

An applicant whose scholastic record does not fully meet the requirements for admission may be admitted probationally (see section on School of Graduate Studies).
Mathematics (MA)

NOTE:
1. No student may receive more than 6 hours credit for MA courses numbered below 150 or more than 3 hours credit for MA courses numbered below 120.
2. Students placed at Level II may receive no more than 3 hours credit for MA courses numbered below 150.
3. Students placed at Level III will receive no credit for MA courses numbered below 150.
4. Students with deficiencies of high school algebra or high school geometry credit must remove these deficiencies prior to enrollment in MA courses numbered 100 or above.
5. No student may enroll in his first MA course at UAH prior to determination of his placement level.

004 High School Algebra
For students with a deficiency of high school credit in algebra.

033 High School Geometry
For students with a deficiency of high school credit in geometry. Prerequisite: MA 004 or one unit of high school algebra.

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

105 College Algebra
No credit given to students who have received credit for another MA course or who are placed at Level II or above. Sets, set operations, the real number system, equations in one variable, polynomials, rational expressions, exponents and radicals, systems of linear equations, matrices, determinants, relations and functions, the exponential and logarithmic functions. Prerequisites: one unit of high school algebra and Level I placement.

119 Precalculus I
Should be taken only by students who are going on to MA 121 and 153. No credit given to students who have received credit for another MA course or who are placed at Level II or above. Sets, real numbers, absolute values, cartesian coordinates, relations and functions, graphs, composite and inverse functions, polynomials, linear equations, quadratic equations, rational functions, exponential and logarithmic functions, systems of equations. Prerequisite: one unit of high school algebra and Level I placement.

121 Precalculus II
Should be taken only by students who are going on to MA 153. No credit given to students who have successfully completed an MA course numbered above 121 or who are placed at Level III. Circular and trigonometric functions, applications of trigonometry, solution of right and oblique triangles, inverse trigonometric functions, trigonometric equations and identities, complex numbers, polynomials, sequences, series, and mathematical induction. Prerequisite: MA 119 or Level II placement.

143 Finite Mathematics
No credit given to students who have successfully completed MA 121 or a higher level MA course or who are placed at Level III. Elementary logic, sets, functions, relations, systems of linear equations, counting, matrices, probability, decision theory, linear programming. Prerequisite: MA 104 or 105 or Level II placement.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>151</td>
<td>An Introduction to Calculus</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>No credit given to students who have received</td>
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<tr>
<td></td>
<td>credit for any other calculus course.</td>
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<tr>
<td></td>
<td>Sequences, limits, continuity, derivatives,</td>
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<tr>
<td></td>
<td>chain rule, derivative tests, logarithm and</td>
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<td></td>
<td>exponential functions, applications of the</td>
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<tr>
<td></td>
<td>derivative, definite integral, techniques of</td>
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<tr>
<td></td>
<td>integration, Fundamental Theorem of Calculus,</td>
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<tr>
<td></td>
<td>applications of the integral.</td>
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<tr>
<td></td>
<td>Prerequisite: MA 143 or Level III placement.</td>
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</tr>
<tr>
<td>153</td>
<td>Calculus and Analytic Geometry</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Functions, limits, continuity, the derivative,</td>
<td></td>
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<tr>
<td></td>
<td>differentials, chain rule, implicit differentiation,</td>
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<td></td>
<td>applications of the derivative, topics in</td>
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<td></td>
<td>analytic geometry. Prerequisite: MA 121 or</td>
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<tr>
<td></td>
<td>Level III placement.</td>
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</tr>
<tr>
<td>154</td>
<td>Calculus and Analytic Geometry</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>The definite integral, the Fundamental Theorem</td>
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<tr>
<td></td>
<td>of Calculus, applications of the definite</td>
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<tr>
<td></td>
<td>integral, exponential and logarithmic functions,</td>
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<td></td>
<td>derivatives and integrals of trigonometric and</td>
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<td></td>
<td>hyperbolic functions and their inverses,</td>
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<td></td>
<td>integration by parts, trigonometric substitutions,</td>
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<td></td>
<td>partial fractions. Prerequisite: MA 153.</td>
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<tr>
<td>233</td>
<td>Calculus and Analytic Geometry</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Infinite series, polar coordinates, vectors</td>
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<td></td>
<td>and analytic geometry in three dimensions,</td>
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<td></td>
<td>vector valued functions. Prerequisite: MA 154.</td>
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<tr>
<td>244</td>
<td>Introduction to Linear Algebra</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>No credit given to students who have successfully</td>
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<tr>
<td></td>
<td>completed either MA 442 or MA 501. Such students</td>
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<tr>
<td></td>
<td>must substitute MA 544. Systems of linear</td>
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<tr>
<td></td>
<td>equations, matrices, matrix operations,</td>
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<tr>
<td></td>
<td>determinants, vector spaces, bases, dimension</td>
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<tr>
<td></td>
<td>of a vector space, inner product spaces, Gram-</td>
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<tr>
<td></td>
<td>Schmidt process, linear transformation, change</td>
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<tr>
<td></td>
<td>of basis, similar matrices, eigenvalues and</td>
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<tr>
<td></td>
<td>eigenvectors, diagonalization, and symmetric</td>
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<tr>
<td></td>
<td>matrices. Prerequisite: MA 233 or MA 151 and</td>
<td></td>
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<td></td>
<td>approval of instructor.</td>
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<tr>
<td>251</td>
<td>Calculus and Analytic Geometry</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Partial differentiation, the chain rule,</td>
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<tr>
<td></td>
<td>directional derivatives, tangent planes,</td>
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<tr>
<td></td>
<td>Lagrange multipliers, multiple integration,</td>
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<tr>
<td></td>
<td>vector fields, line integrals, Green's Theorem,</td>
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<td></td>
<td>divergence and curl, surface integrals, Stokes'</td>
<td></td>
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<tr>
<td></td>
<td>Theorem. Prerequisite: MA 233.</td>
<td></td>
</tr>
<tr>
<td>333</td>
<td>Introduction to Geometry</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Axiomatic development of geometry. Introduction</td>
<td></td>
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<tr>
<td></td>
<td>to non-Euclidean geometries with emphasis in</td>
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<tr>
<td></td>
<td>elliptic and hyperbolic geometries. Selected</td>
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</tr>
<tr>
<td></td>
<td>topics in Euclidean geometry.</td>
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</tr>
<tr>
<td></td>
<td>Prerequisite: MA 244 or approval of instructor.</td>
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</tr>
<tr>
<td>350</td>
<td>Logic and the Real Number System</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Symbolic logic, set theory, the axiomatic</td>
<td></td>
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<tr>
<td></td>
<td>method, abstract algebra, number systems, the</td>
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<tr>
<td></td>
<td>real number system and the limit concept.</td>
<td></td>
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<tr>
<td></td>
<td>No credit given to students who have successfully</td>
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</tr>
<tr>
<td></td>
<td>completed either MA 442 or MA 502. Prerequisite:</td>
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<tr>
<td></td>
<td>MA 244.</td>
<td></td>
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<tr>
<td>352</td>
<td>Introduction to Differential Equations</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>First-order differential equations, linear</td>
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<tr>
<td></td>
<td>differential equations, linear differential</td>
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<tr>
<td></td>
<td>equations with variable and constant coefficients,</td>
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<tr>
<td></td>
<td>variation of parameters, Laplace transforms,</td>
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<td></td>
<td>series solutions, selected applications.</td>
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<tr>
<td></td>
<td>Prerequisite: MA 251. It is recommended that the</td>
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<tr>
<td></td>
<td>student take MA 244 prior to taking this course</td>
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<td></td>
<td>for a better understanding of the material in</td>
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<tr>
<td></td>
<td>this course.</td>
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<tr>
<td>385</td>
<td>Introduction to Probability</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>No credit given to students who have successfully</td>
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<tr>
<td></td>
<td>completed MA 585. Finite probability spaces,</td>
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<tr>
<td></td>
<td>conditional probability, random variables,</td>
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<td>expectation, random and limiting processes</td>
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<tr>
<td></td>
<td>leading to distributions including uniform,</td>
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<tr>
<td></td>
<td>binomial, and Poisson. Prerequisites: At least</td>
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<tr>
<td></td>
<td>one MA course at the 200 level or above.</td>
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</tr>
</tbody>
</table>
Elementary Numerical Methods 3 hrs.
Iterative methods for the solution of non-linear equations, error analysis, acceleration of convergence, interpolation and approximation of functions, numerical integration. Use of digital computer recommended. Prerequisite: MA 244, 251, or approval of instructor.

Introduction to Abstract Algebra 3 hrs.
Introductory study of groups, rings, integral domains and fields. Elementary theory of numbers. Prerequisite: at least one MA course at 300 level or above.

Senior Seminar 1-3 hrs.
The purpose of this course is to enable the mathematics faculty to offer selected undergraduate topics in mathematics. Prerequisite: approval of instructor.

Introduction to Real Analysis (formerly MA 501) 3 hrs.
Sequences, limits, continuity, and differentiation of functions of one real variable, Riemann integration, uniform convergence, sequences and series of functions, power series, and Taylor series. Prerequisite: MA 350 or 352 or 442 or approval of instructor.

Numerical Analysis 3 hrs.

Introduction to Complex Analysis 3 hrs.
Complex algebra, analytic functions, Cauchy-Riemann equations, exponential, trigonometric, and logarithmic functions, integration, Cauchy integral theorem, Morera’s theorem, Liouville’s theorem, maximum modulus theorem, residue theory, Taylor and Laurent series, and applications. Prerequisite: MA 502 or approval of instructor.

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

Partial Differential Equations 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.

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.

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.

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 502.

Functions of Several Variables 3 hrs.
Topology of $E^n$, limits, continuity, and differentiation of functions of several real variables,
Jacobians, the implicit function and the inverse function theorems, Riemann integration of functions of several real variables, and the change of variables theorem for multiple integrals. Prerequisite: MA 502.

570 Metric Spaces with Applications 3 hrs.
Basic metric spaces, continuous functions, compactness, completeness, contraction mappings, applications of the theory to implicit functions and to existence of solutions of differential equations, the Arzela-Ascoli theorem, the Stone-Weierstrass theorem, and an introduction to Fourier series. Prerequisite: MA 551.

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 and sufficient conditions for extrema of a definite integral in both parametric and nonparametric representations in the plane, the Bolza problem. Prerequisite: MA 502 or approval of instructor.

633 Geometry 3 hrs.
Axioms of incidence and order, affine structure of the plane, metric properties, isometries, similarity transformations, the group of angles, orientation. Prerequisite: MA 442, 544 or approval of instructor.

642 Abstract Algebra 3 hrs.
Isomorphism theorems for groups, rings and modules, group automorphism, direct products, first Sylow theorem, unique factorization domain and principal ideal domain, finite fields, field extensions, Kronecker's theorem, basic notions about modules. Prerequisite: MA 442 or approval of instructor.

644 Matrix Theory I 3 hrs.
Matrix polynomials, characteristic and minimal polynomials, functions of matrices, invariant polynomials, elementary divisors, similarity of matrices, normal forms of a matrix, matrix equations, generalized inverses. Prerequisite: MA 544.

653 Real Analysis I 3 hrs.
Archimedean ordered fields, the real number system, characterization of open and closed sets, Lebesgue measure of open, closed, $G_\delta$, $F_\sigma$-sets, 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 bounded, nonnegative functions and of general measurable functions, Fatou's lemma, and the Lebesgue dominated convergence theorem. Prerequisite: MA 570.

656 Complex Analysis I 3 hrs.
Topology of the complex plane, analytic functions of one complex variable, elementary functions and their mapping properties, power series, complex integration, Cauchy's theorem and its consequences, isolated singularities, Laurent series, residue theory. Prerequisite: MA 502, 551 or approval of instructor.
Introduction to Functional Analysis
Normed and inner product spaces, finite dimensional spaces, product and quotient spaces, equivalent norms, the Hahn-Banach theorem, the principle of uniform boundedness, the open mapping theorem, the Riesz representation theorem, complete ortho-normal sets, Bessel's inequality, Parseval's identity, and conjugate spaces. Prerequisite: MA 570.

General Topology
Topological spaces, bases, subbases, subspaces, continuity and homeomorphisms, topological properties (first and second axiom of countability, separability, Lindelof property, compactness, connectivity, and separation axioms), heredity of topological properties, generalized products, the product topology, product invariance of topological properties, and introduction to Moore-Smith convergence. Prerequisite: MA 570.

Stochastic Processes
Normal, Wiener, stationary and Poisson processes, counting and renewal processes, discrete and continuous Markov chains, and generalized recurrent events. Prerequisite: MA 585, 244 or approval of instructor.

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

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

Group Theory
The isomorphism theorems, permutations groups, the basis theorem and the fundamental theorem for finite abelian groups, the Remak-Krull, Schmidt theorem, the Sylow Theorems, normal series, solvable groups, extensions, selected topics in representation theory. Prerequisite: MA 642 or approval of instructor.

Matrix Theory II
Special types of complex matrices, nonnegative matrices, stochastic matrices, localization of eigenvalues, and selected advanced topics. Prerequisite: MA 644 or approval of instructor.

Theory of Differential Equations
Existence and uniqueness of solutions, initial value problems, theorems of Picard-Lindelof, Cauchy-Peano and Kamke, stability problems, two-point boundary value problems, orthogonal systems, perturbation theory, Poincare-Bendixon theory. Prerequisite: MA 525, 653 or approval of instructor.

Real Analysis II
Vitali's covering theorem, differentiability of monotone functions, functions of bounded variation, absolute continuity, Lebesgue integral of the derivative of an absolutely continuous function, Minkowski and Holder inequalities, Lp spaces, Riesz-Fischer representation theorem, abstract measure spaces, equivalence and singularity of measures, Radon-Nikodym theorem, Fubini's theorem, signed measures, and selected topics. Prerequisite: MA 653.

Complex Analysis II
Applications of residue theory, harmonic functions and their applications, Mittag-Leffler theorem, infinite products, Weierstrass product theorem, conformal mapping and the Riemann mapping theorem, univalent functions, analytic continuation and Riemann surfaces, Picard's theorems, and selected topics. Prerequisite: MA 656 or approval of instructor.
Advanced Theory of Probability
Probability measure, stochastic independence, modes of convergence, limit theorems, an introduction to Brownian motion. Prerequisite: MA 585, 653 or approval of instructor.

Graduate Seminar
The purpose of this course is to enable the mathematics faculty to teach selected topics to students in the Cooperative Ph.D. Program. Prerequisite: approval of instructor.

Doctoral Dissertation
Required each term a student is working and receiving direction on his Ph.D. thesis in the Cooperative Ph.D. Program. Prerequisite: approval of instructor.

Statistics (ST)

Applied Statistics I
Collection and presentation of data, averages, dispersion and skewness, bionomial, normal, X^2, t- and F- distributions, estimation, confidence intervals and tests of significance. Includes laboratory. Lab Fee: Level 2. Prerequisite: MA 104, 105, 119 or Level II placement. A student cannot receive credit for both ST 287 and another course equivalent to EC 231.

Applied Statistics II
Linear and nonlinear regression, rank and Pearson correlations, an introduction to multiple regression and analysis of variance, nonparametric methods. Prerequisite: ST 287 a course equivalent to EC 231.

Theory of Statistics I
Distribution of statistics based on ordered samples, asymptotic sampling distributions, maximum likelihood, least squares, and other methods of point estimation, Rao-Blackwell theorem and Cramer-Rao inequality, confidence intervals, regions, and their optimality properties, Neyman-Pearson formulation and tests of simple hypothesis against simple alternatives. Prerequisite: MA 244, 585.

Theory of Statistics II
Continuation of hypothesis testing, likelihood ratio and unbiased tests, uniformly most powerful tests, power function, non-parametric tests, statistical decision theory, distribution and linear models. Prerequisite: ST 687.

Physics
Professor: Castle, Chan; Associate Professors: Davis, Rush, Sung, Smalley (chairman); Adjunct Professors: Stettler, Stuhlinger, Tandberg-Hanssen, Wu; Research Professor: McKnight; Associate Research Professors: Hendricks, Kidron; Assistant Research Professor: Comfort

Undergraduate Programs
The basic courses for a B.S. degree with a major in physics include: PH 111, 112, 113, 201, 241, 310, 311, 312, 321, 331, 351. Three approved AOC's are listed. Other AOC's may be approved after consultation with 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 111, 112, 113, 201, 241, 310, 311, 312, 321, 331, 337, 351, 401, 431, one senior lab at 400 level, 551, 552 45
Mathematics—MA 153, 154, 233, 244, 251, 352, 502, 521 24
Chemistry—CH 121-123, 125, 126 8
Electives 15-21

Curriculum II

Natural Science AOC with Emphasis on Physics

Semester Hours

General Education Requirements (humanities and social sciences) 30-36
Physics—PH 111, 112, 113, 104, 105, 201, 241, 310, 311, 331, 351 30
Chemistry—CH 121-123, 125, 126, 331, 332, 333, 335 15
Mathematics—MA 153, 154, 233, 244, 251, 352 18
Biology—BY 113-114, 319, 3 hours elective 14
Electives 15-21

Curriculum III

AOC with Physics Major for Class B Secondary Professional Teaching Certificate

Semester Hours

General Education Requirements (humanities and social sciences) 30-36
Physics—PH 111, 112, 113, 104, 201, 241, 310, 311, 312, 321, 331, 351 31
Mathematics—MA 153, 154, 233, 244, 251 15
Chemistry—CH 121, 123, 125, 126 8
Biology—BY 113 4

With Chemistry Minor:
Chemistry—CH 223, 331, 332, 333, 341, 342 or (335, 336) 15
Education core 21
Electives 0-4

With Mathematics Minor:
Mathematics—MA 333, 442, 385 or 585 9
Education core 21
Electives 4-10

With Biology Minor:
Biology—BY 114, 319, 11 hours elective 18
Education core 21
Electives 0-1

Graduate Programs

The physics faculty offers programs of study leading to the Master of Science degree under Plan I or Plan II and to the Doctor of Philosophy degree.

General information about the graduate programs at UAH and the general
requirements for advanced degrees are given in the section on Graduate Studies. 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. Two options are available for the Master of Science degree under Plan II:

A. Theoretical Physics Option: PH 601, 622, 631, 632, 651, and 652 are required. This option is designed for those students who are oriented towards theoretical physics and/or for those who desire to complete course requirements early for an advanced degree program.

B. Applied Physics Option: PH 601, 622, and 631 are required plus at least three additional courses designed to stress applications to the various branches of physics. Since many of these topics are contemporary in nature, advance topics normally occur under the heading of Selected Topics. Frequently offered selected topics courses include Fourier optics, laser physics, electron spin resonance, microwave properties of solids, physics of plasmas, superconductivity. These additional courses can best be arranged through consultation with the student's advisor. Each candidate for the Master of Science degree must also pass the comprehensive examination. This examination will normally be administered during the spring term.

The physics faculty encourages students to carry out programs of study oriented toward applied physics. For this purpose Selected Topics 680-689 and 780-789 are offered frequently in areas such as laser physics, properties of materials, and phases of matter.

Doctor of Philosophy

A statement of procedures for admission to the Ph.D. program in physics may be obtained from the physics department office.

Admission to the Ph.D. program in physics is dependent 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 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 fulltime graduate work or the equivalent in part-time work, the student may be required to take the Qualifying Examination. This examination may be taken no more than twice and is designed to test the student's fitness for pursuing a research project in his chosen area and to test his general knowledge of physics.

A significant portion of the dissertation must be submitted for publication in an approved journal with international circulation.
Physics (PH)

Prerequisites for physics courses are listed in the interest of the students. Prerequisites may be waived by the instructor or the department chairman for auditors or students with equivalent experience.

101 General Physics 4 hrs.
An introductory course intended mainly for the nonscience student. Intended to be phenomenological in nature with emphasis on understanding basic ideas of physics and ability to apply these ideas to specific problems. Subjects covered include Newtonian mechanics, conservation laws, electrostatics, and currents. Includes laboratory. PH 101-102 satisfy laboratory science requirement. Lab Fee: Level 3. Prerequisite: high school algebra. Fall, Summer.

102 General Physics 4 hrs.
Continuation of PH 101. Includes laboratory. Subjects covered include: magnetic phenomena, relativity, waves, quantum nature of matter. Includes laboratory. Lab Fee: Level 3. Prerequisite: PH 101. Winter, Summer.

104 Astronomy of the Solar System 3 hrs.
Includes laboratory with telescope observation. Lab Fee: Level 2. Prerequisite: high school algebra and trigonometry. Winter.

105 Stellar Astronomy 3 hrs.
Continuation of PH 104, includes laboratory with telescope observation. Lab Fee: Level 2. Prerequisite: PH 104. Spring.

111 General Physics with Calculus I 4 hrs.
An introductory course intended for science and engineering students. Intended to be phenomenological and quantitative in nature with emphasis on understanding basic ideas of physics and ability to apply these ideas to specific problems. Subjects covered include vectors, Newtonian mechanics, energy, simple harmonic motion and wave motion. Includes laboratory. PH 111-112 satisfy laboratory science requirements. Lab Fee: Level 3. Prerequisite or parallel: MA 153. Fall, Winter.

112 General Physics with Calculus II 4 hrs.
Continuation of PH 111. Subjects covered include heat and thermodynamics, basic electricity, electric and magnetic fields, electromagnetic waves and optics. Includes laboratory. Lab Fee: Level 3. Prerequisite or parallel: MA 154. Winter, Spring.

113 General Physics with Calculus III 2 hrs.
Continuation of PH 111-112. Modern physics part of the general physics sequence. Subjects covered include relativity, quantum effects, atomic and nuclear structure, and elementary particles. May be taken parallel to PH 112. 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 111. 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
Electronick instrumentation, electric fields, motion of charged particles. Lab Fee: Level 3. Prerequisite or parallel: PH 331. Spring.

312 Intermediate Laboratory III
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; microscopy theory, absolute temperature, entropy, canonical distribution, and equipartition of energy. Prerequisite: PH 331. Winter.

323 Energy Studies
3 hrs.
Techniques for estimating energy resources, energy consumption patterns, analysis of energy losses in the automobile with practical conservation ideas. Conflicts between energy and environment, and economic and political considerations. Prerequisites: PH 102 or 113. Spring.

324 Non-Nuclear Energy Studies
3 hrs.
Topics in non-nuclear technologies including oil recovery and coal mining techniques, hydrogen and synthetic fuel production, energy storage techniques, solar voltaic conversion, solar thermal conversion, geothermal energy, and energy production from wind, tides, waves, and ocean thermal gradients. Progress and outlook are reviewed along with current problems, economic considerations, and theoretical limitations. Prerequisites: PH 323 or permission. Fall.

325 Nuclear Energy Studies
3 hrs.
Topics in nuclear technology including fission reactor physics, design analysis and neutron budget, safety considerations, comparison of reactor types, fast breeder reactor problems and outlook, and waste disposal problems. Topics in controlled thermonuclear fusion including the Lawson criteria, plasma instabilities, current status of various magnetic confinement devices, and recent progress in inertsilly-confined fusion. Prerequisites: PH 324 or permission. 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 equation. Prerequisite: PH 201. Prerequisite or parallel: MA 251. (Engineers see EG 307 for prerequisites of PH 331.) Fall, Spring.

337 Electronics
4 hrs.
Introductory course for all science students. Basic AC and DC circuits, vacuum tube circuits, transistor circuits, power supplies, feedback, use of above in laboratory instruments. Laboratory included. Lab Fee: Level 3. Prerequisite: PH 331. Summer.

351 Quantum Physics
3 hrs.
Quantum hypothesis, physical quantities, theory of measurement; uncertainty principle, energy levels; photons; particles, de Broglie waves; phenomenological wave mechanics, Schroedinger's wave equation, hydrogen-like systems, interactions. Prerequisite: PH 241, 331. Fall.

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

412 Optics and Spectroscopy Laboratory
1 hr.
Experiments in optics including image formation and aberrations, study of diffraction
gratings, plane and concave grating spectrographs, photoelectric and photographic spectroscopy, analysis of spectra. Lab Fee: Level 2. Offered upon demand.

413 Nuclear Physics Laboratory
Statistics in counting processes, beta-ray continuum, scintillation spectroscopy. 1 hr.

414 Solid State Physics Laboratory
Fundamental solid state experiments, including electron paramagnetic resonance, nuclear magnetic resonance, Hall effect, cyclotron resonance, Mössbauer spectroscopy. Lab Fee: Level 2. Offered upon demand.

415 X-Ray Laboratory
Powder and single crystal x-ray photography with theory as needed. Lab Fee: Level 3. Offered upon demand.

416 Senior Laboratory
Selected experiments from PH 412-415. Lab Fee: Level 3.

420 Senior Thesis
Semi-original work performed under the direction of a faculty member. Lab Fee: Level 4.

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

506 Introduction to Astrophysics of Solar Systems
Review of astronomical concepts necessary for understanding of solar systems. Topics covered include radiation theory, luminosity, mass and size of stars, stellar spectra, color-magnitude diagrams, stellar structure and energy production, main sequence stars, and ages of stars, galaxies and the universe. Prerequisite: PH 431. Fall.

521 Thermal Physics
An introduction to thermal phenomena, both on a macroscopic and on a statistical basis, and to the principles and laws governing them. Prerequisite: PH 431. Summer.

531 Introduction To Plasma Dynamics
Plasma kinetic theory, including charged-particle and neutral collision, ionization, electronic excitation and recombination, motion of charged particles, macroscopic equations; transport coefficients, gas discharges, instabilities, sheath and oscillation electromagnetic waves and radiation. See EG 559. Prerequisite: PH 431 and PH 321. Winter.

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

541 Optics I
Review of geometrical optics. Physical optics including interference, diffraction, partial coherence, polarization, interaction of radiation with matter. Prerequisite: PH 431. Fall.

551 Introductory Quantum Mechanics
Background of the quantum theory, wave-particle duality and uncertainty principle, basic postulates of quantum mechanics, angular momentum and spin, simple systems in one, two, and three dimensions, perturbation theory, scattering theory, applications. Prerequisite: PH 351, 401, 431. Fall. Same as CH 553.

552 Introductory Quantum Mechanics
Continuation of PH 551. Prerequisite: PH 551. Winter. Same as CH 554.
561 Introduction to Solid State Physics
Crystal diffraction, the reciprocal lattice binding energies, phonons, thermal properties of insulators, free electron gas and energy bands in crystal. Prerequisite or parallel: PH 551. Winter.

565 Introduction to Nuclear Physics
Stable nuclei, isotopes, nuclear reactions, nuclidic masses, binding energy, scattering experiments, nuclear cross sections, spins, energy levels, nuclear models. Prerequisite or parallel: PH 552. Spring.

571 Introduction to Elementary Particles
Invariance principles and quantum numbers, symmetry schemes, scattering and reactions, resonances, strong-interaction dynamics, and weak interactions. Prerequisite: PH 552. Spring.

601 Classical Dynamics

607 Mathematical Methods I
Review of vector calculus and coordinate systems, introduction to tensors, matrices, infinite series, complex variables with applications to calculus of residues, partial differential equations and the Sturm-Liouville theory. Prerequisites: MA 521. Fall.

609 Mathematical Methods II

622 Kinetic Theory and Statistical Mechanics
Review of thermodynamics, kinetic theory, classical statistical mechanics, canonical and grand canonical ensembles, quantum statistical mechanics, Bose and Fermi statistics, the partition function. Prerequisite: PH 521, 552, MA 521. Fall.

631 Electromagnetic Theory I

632 Electromagnetic Theory II

641 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.

651 Quantum Mechanics I
Review of basic principles, general formulation in Hilbert space, angular momentum, steady-state perturbation theory, scattering theory and applications. Prerequisite: PH 552, 601, 609. Fall.

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

661 Intermediate Solid State Physics
Topics surveyed include semiconductor crystals, superconductivity, dielectric polarization,
ferroelectric crystals, diamagnetism, paramagnetism, ferromagnetism, antiferromagnetism, magnetic resonance, optical phenomena in insulators, point defects and dislocations. Prerequisite: PH 561 or equivalent; Prerequisite or parallel PH 631. Spring.

689 Selected Topics 3 hrs.
Offered upon demand. Previous topics include: Superconductivity, optical properties of solids in the infrared, laser propagation, collision theory, quantum electronics and microwave properties of solids.

699 Master's Thesis 3 hrs.
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.

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. Winter.

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. Summer.

723 Kinetic Theory and Statistical Mechanics 3 hrs.
Advanced topics in kinetic theory and statistical mechanics. Prerequisite: PH 622. Summer.

753 Advanced Quantum Mechanics 3 hrs.
Relativistic wave equations, second quantization, interacting fields, Feynman techniques. Prerequisite: PH 652. Spring.

761 Advanced Solid State Physics 3 hrs.
Selected topics from quantum theory of solid state physics including many-body technique, transport properties, optical properties, superconductivity. Prerequisite: PH 652, 661. Fall.

789 Selected Topics 3 hrs.
Offered upon demand. Previous topics include: Superconductivity, optical properties of solids in the infrared, laser propagation, collision theory, quantum electronics and microwave properties of solids.

792 Physics Seminar No credit
Students report on journal articles or individual research. Prerequisite: PH 552. Two terms required for M.S. students. Fall, Winter, Spring.

799 Doctoral Dissertation 3, 6, or 9 hrs.

Engineering

Department of Electrical Engineering
Professors: Audeh, Dowdle, Halijak, Johnson, Polge; Associate Professors: Kheir, Thurstone (chairman); Instructor: Green

Department of Industrial and Systems Engineering
Professors: Brown (chairman), Shannon; Associate Professor: Wyskida; Assistant Professors: Joost, Pegden; Adjunct Professor: Bucher

Department of Mechanical Engineering
Professors: Chung, Grohse, Kubitza, Liu, Shih, Wu; Professor Emeritus: Hermann;
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 Minor

Students with non-engineering majors who wish to select a minor in engineering, must take a minimum of 21 hours in engineering courses to be selected with the assistance of an engineering advisor and approved by the chairman of one of the engineering departments.

Course Numbers

The course numbering system of UAH is coded for engineering courses so that the second digit indicates the engineering department as follows:

<table>
<thead>
<tr>
<th>Course</th>
<th>Middle Digit</th>
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</thead>
<tbody>
<tr>
<td>Electrical Engineering</td>
<td>0-1</td>
</tr>
<tr>
<td>Industrial and Systems Engineering</td>
<td>2-3</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>4-7</td>
</tr>
<tr>
<td>General Engineering</td>
<td>8-9</td>
</tr>
</tbody>
</table>

Undergraduate Engineering Program

Bachelor of Science in Engineering Degree Program

The engineering program has as its primary objective the preparation of qualified students for careers in any one of many engineering disciplines, for research, and for advanced studies. It stresses a broad education in 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 Electrical Engineering, Industrial and Systems Engineering, Mechanical Engineering, or Structural Engineering. The Electrical Engineering, Industrial and Systems Engineering and Mechanical Engineering options are accredited by the Engineers' Council for Professional Development (ECPD). The other options are under preparation for ECPD accreditation evaluation.

A student will be awarded the degree of Bachelor of Science in Engineering upon
successful completion of all requirements, including a minimum of 129 semester hours of course work.

High School Preparation and Prerequisite Courses

Students who intend to pursue the BSE Degree should carefully read the section of this Catalog (p. ) dealing with admission to the Freshman Class. Students who have had inadequate preparation or who are placed in certain lower level classes due to the results of placement tests may be required to take one or more of the following courses:

EH 003 Remedial Writing ......................................................... No Credit
CH 101 General Chemistry ...................................................... 3 hrs.
CH 105 General Chemistry Laboratory ...................................... 1 hr.
MA 119 Precalculus I .............................................................. 3 hrs.
MA 121 Precalculus II ............................................................ 3 hrs.

These courses carry the academic credit indicated, which will appear on the transcripts of students who successfully complete these courses. Since these courses are prerequisite to courses required for the BSE, any credit earned in one or more of these prerequisite courses may not be applied toward the 129 hour minimum requirement for the BSE.

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 must successfully complete courses in each of the following eight categories:

Semester Hours

1. English Composition—EH 101, 102 ........................................... 6
2. Basic Science:
   General Physics—PH 111, 112 .............................................. 8
   Electricity and Magnetism—PH 331 (EG 307) ............................. 3
   Chemistry—CH 121, 125 ...................................................... 4
3. Mathematics:
   Calculus and Analytic Geometry—MA 153, 154, 233, 251 ................. 12
   Linear Algebra—MA 244 ..................................................... 3
   Differential Equations—MA 352 ............................................. 3
4. Humanities and Social Sciences:
   Engineering students are required to take a total of 15 semester hours (in addition to EH 101 and 102) in the humanities and social sciences, including EC 142. The remaining twelve semester hours should be a balanced choice from the following areas: art, literature, history, music, philosophy, sociology, psychology, political science, geography, economics.
   Courses should be elected to fulfill an objective appropriate to the engineering profession. Courses treating subjects such as accounting, industrial management, finance, personnel administration, introductory language and ROTC normally do not fulfill this objective regardless of their general value in the total engineering curriculum.
5. Engineering Core:
   Freshman Engineering Seminar—EG 195 .................................. 1
   FORTRAN Programming—EG 196 .......................................... 2
   Engineering Graphics—EG 198 .............................................. 2
   Introduction to Production and Operations Management—EG 220 ......... 3
Statics—EG 270 ............................................. 2
Nature and Properties of Materials—EG 294 ........................ 3
Electrical Circuits I—EG 300 .................................. 3
Electronics and Instrumentation Lab—EG 301 ......................... 1
Electronics and Instrumentation—EG 311 ............................ 3
Engineering Economy—EG 321 .................................. 3
Thermodynamics I—EG 341 ...................................... 3
Fluid Mechanics—EG 352 ....................................... 2
Particle Dynamics—EG 363 ...................................... 2
Mechanics of Materials—EG 370 .................................. 3
Operational Methods—EG 381 ................................... 2
Probability and Statistics—EG 390 ................................. 3
Numerical Methods and Computation—EG 396 ......................... 2
Analysis and Control of Dynamical Processes—EG 487 ............... 2
Analysis of Engineering Systems—EG 488 .......................... 3
Engineering Design—EG 493, 494 ................................ 4

6. Engineering Options

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

**Electrical Engineering Option**—The electrical engineering option offers a background that will enable students to pursue careers in any of the many and diverse facets of electrical engineering such as electronics, networks, power systems instrumentation, computers, communications, and controls. Additionally, the student may select advanced undergraduate courses to develop his or her individual and specific interests.

<table>
<thead>
<tr>
<th>Semester Hours</th>
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<tbody>
<tr>
<td>Electrical Circuits Laboratory—EG 303</td>
</tr>
<tr>
<td>Electronics Laboratory I—EG 305</td>
</tr>
<tr>
<td>Electrical Circuits II—EG 313</td>
</tr>
<tr>
<td>Electronics I—EG 316</td>
</tr>
<tr>
<td>Electrical Engineering Elective</td>
</tr>
<tr>
<td>Group Elective (choose a,b,c):</td>
</tr>
<tr>
<td>a) Electronics Laboratory II—EG 406</td>
</tr>
<tr>
<td>Electromagnetic Waves—EG 407</td>
</tr>
<tr>
<td>Electronics II—EG 416</td>
</tr>
<tr>
<td>b) Logic Circuits—EG 502</td>
</tr>
<tr>
<td>Digital Electronics—EG 516</td>
</tr>
<tr>
<td>Digital Electronics Laboratory—EG 519</td>
</tr>
<tr>
<td>c) Electrical Networks Laboratory—EG 404</td>
</tr>
<tr>
<td>Electric Power Systems—EG 411</td>
</tr>
<tr>
<td>Passive Electrical Networks—EG 414</td>
</tr>
</tbody>
</table>

**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>Semester Hours</th>
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<tbody>
<tr>
<td>Probability and Engineering Statistics II—EG 421</td>
</tr>
<tr>
<td>Systems Analysis—EG 422</td>
</tr>
</tbody>
</table>

204
Management Systems Analysis—EG 427 .................................................. 3
Introduction to Human Engineering—EG 524 .............................................. 3
Operations Research I—EG 525 ................................................................. 3
Industrial and Systems Engineering Elective ............................................. 3

**Mechanical Engineering Option**—Mechanical Engineering is a broad field which traditionally is considered to comprise three primary sub-fields: energy, mechanisms and machinery, and manufacturing. The work done by mechanical engineers includes: the design, construction, and use of systems for the conversion of energy available from natural sources (water, fossil fuels, nuclear fuels, solar radiation, etc.) to other forms of useful energy (for transportation, heat, light, power, etc.); the design and production of machines to lighten the burden of servile human work and to do work otherwise beyond human capability; the processing of materials into useful products; and the creative planning, development, and operation of systems for using energy, machines, and resources.

<table>
<thead>
<tr>
<th>Semester Hours</th>
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</thead>
<tbody>
<tr>
<td>Thermodynamics II—EG 342 ................................................. 3</td>
</tr>
<tr>
<td>Heat and Mass Transfer—EG 442 ............................................. 4</td>
</tr>
<tr>
<td>Kinematics and Dynamics of Rigid Bodies—EG 364 ...................... 4</td>
</tr>
<tr>
<td>Mechanics and Design of Machine Elements—EG 466 ....................... 3</td>
</tr>
<tr>
<td>Elective in Mechanical Engineering Design, Chosen from ............... 3</td>
</tr>
<tr>
<td>EG 446, EG 550, or EG 552 ......................................................</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>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural Analysis I—EG 371 ................................................. 3</td>
</tr>
<tr>
<td>Elements of Structural Design—EG 374 ....................................... 3</td>
</tr>
<tr>
<td>Structural Analysis II—EG 471 .................................................. 2</td>
</tr>
<tr>
<td>Vibrations of Elastic Systems—EG 561 ........................................ 3</td>
</tr>
<tr>
<td>Applied Mechanics of Solids—EG 571 ........................................ 3</td>
</tr>
<tr>
<td>Elective in Structural Engineering ........................................... 3</td>
</tr>
</tbody>
</table>

7. Approved Technical Elective:

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.

8. Free Electives:

In general, for 3 semester hours of free electives 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 or her program. Departmental approval required.

**B.S.E. Curriculum**—The engineering curriculum is highly structured and it is extremely important that all students consult with their faculty advisor regularly (at least twice each year) in order to plan their programs of study.
Suggested Schedule of Courses for Full-Time Engineering Students

<table>
<thead>
<tr>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>EH 101</td>
<td>3 EH 102</td>
<td>3 Hu/SS</td>
</tr>
<tr>
<td>MA 153</td>
<td>3 MA 154</td>
<td>3 MA 233</td>
</tr>
<tr>
<td>CH 121 &amp; 125</td>
<td>4 PH 111</td>
<td>4 PH 112</td>
</tr>
<tr>
<td>EG 198</td>
<td>2 EG 196</td>
<td>2 EG 195</td>
</tr>
<tr>
<td></td>
<td>12 hrs.</td>
<td>12 hrs.</td>
</tr>
<tr>
<td></td>
<td>35 hrs.</td>
<td>35 hrs.</td>
</tr>
<tr>
<td>*Hu/SS</td>
<td>12 hrs.</td>
<td>11 hrs.</td>
</tr>
<tr>
<td>MA 251</td>
<td>3 MA 244</td>
<td>3 MA 352</td>
</tr>
<tr>
<td>EG 220</td>
<td>3 EC 142</td>
<td>3 EG 321</td>
</tr>
<tr>
<td>EG 294</td>
<td>3 EG 270</td>
<td>2 EG 370</td>
</tr>
<tr>
<td></td>
<td>12 hrs.</td>
<td>11 hrs.</td>
</tr>
<tr>
<td></td>
<td>35 hrs.</td>
<td>35 hrs.</td>
</tr>
<tr>
<td>EG 300</td>
<td>3 EG 352</td>
<td>2 EG 301</td>
</tr>
<tr>
<td>EG 341</td>
<td>3 EG 381</td>
<td>2 EG 311</td>
</tr>
<tr>
<td>EG 363</td>
<td>2 EG electives*</td>
<td>7 EG 390</td>
</tr>
<tr>
<td>EG 396</td>
<td>2 EG elective*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 hrs.</td>
<td>11 hrs.</td>
</tr>
<tr>
<td></td>
<td>31 hrs.</td>
<td>31 hrs.</td>
</tr>
<tr>
<td></td>
<td>10 hrs.</td>
<td>10 hrs.</td>
</tr>
<tr>
<td></td>
<td>28 hrs.</td>
<td>28 hrs.</td>
</tr>
<tr>
<td></td>
<td>129 hrs.</td>
<td>129 hrs.</td>
</tr>
</tbody>
</table>

*Hu/SS: 12 hours in Humanities/Social Sciences.

* Engineering option, technical or free electives (see departmental office for specifics)

Graduate Engineering Programs

The School of Science and Engineering offers programs leading to the degree of Master of Science in Engineering, Master of Science in Operations Research, and Doctor of Philosophy. Specializations for the MSE and PhD are in the following areas:

Electromagnetic Fields
Network Theory
Communications and Information Theory
Digital and Analog Computer Engineering
Control Sciences
Human Engineering
Engineering Management

Operations Research
Thermodynamics, heat and mass transfer
Fluid Mechanics
Systems Engineering
Environmental Engineering
Solid Mechanics
Dynamics

Admission

In addition to admission requirements (for both unconditional and probationary) stated in the Graduate School section of this catalog, the following three paragraphs specify further requirements for admission (unconditional or probationary admission) for graduate study in engineering.

For unconditional admission to graduate study, a student is required (1) to have earned a B average (2.0 out of a possible 3.0) in all undergraduate work attempted as well as in all engineering courses attempted; (2) to have scored at least 1000 on the aptitude portion of the GRE; and (3) to have received a bachelor's degree in an engineering curriculum which was accredited by the Engineers' Council for Professional
Development at the time the degree was conferred. An exception to item (3) is made for students in the MSOR Program.

Probationary admission may be granted to other students who have baccalaureate degrees and who are considered, after an individual examination of quantity and quality of their work, to be properly prepared and capable of successfully pursuing graduate work toward an acceptable graduate objective. Students admitted 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.

Applicants for admission to graduate study in engineering are required to take the Advanced Engineering portion of the GRE, the results of which will be considered in determining the qualification of the student to pursue successfully a program of graduate study.

Students who are admitted to the University as Irregular Post Graduates but who have been denied admission to the Graduate School because of a deficiency in quality point average (QPA) and/or GRE score may be reconsidered for graduate admission provided they are otherwise eligible to pursue a particular engineering discipline. In order to be reconsidered they must successfully complete 12 hours of courses numbered 500 or above (as recommended by the department into which admission is being sought) in engineering, mathematics, or sciences with an average grade of B or better.

General Requirements for the MSE and MSOR Degrees

In addition to the requirements for all masters degrees specified by the School of Graduate Studies, the following general requirements for the master's degree are specified by the School of Science and Engineering.

1. Average grade on the courses numbered 600 or above cannot be less than B.
2. Engineering courses numbered between 500 and 599 may be taken for graduate credit with prior approval of such courses on the student's plan of study. Graduate students will be required to do extra work of appropriate nature in 500 level courses. A minimum grade of B must be attained in each engineering course designated by a number less than 600 in the plan of study; otherwise a substitution of another approved course will be necessary.
3. All courses are selected by the student with the counsel of the adviser and are subject to approval by the appropriate department chairman, the Dean of the School of Science and Engineering, and the Dean of the Graduate School. Additional course work may be required to correct deficiencies in undergraduate subjects.
4. Each department may require a seminar course(s) in addition to other requirements.

Upon admission to graduate study by the Dean of the Graduate School, the student will be referred to the appropriate department chairman. A supervisory committee, which usually is but does not have to be the same as the final examining committee, should be appointed after the student has completed 12 semester hours.

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 in mathematics courses with MA or ST prefix, at 500 level or above. With the approval of the student's advisor, substitutions for these six hours may be selected from EG 621, EG 692, EG 693, EG 721 provided that such EG courses are not counted in the requirement "b" above.

With prior approval, up to 12 hours of courses numbered 500-599 may be taken in fulfillment of these requirements.

Plan One—Students selecting the master's degree program Plan One must: (a) Successfully complete an approved Basic Program of Study; (b) Complete an acceptable thesis. (See statement with EG 699); (c) Pass a comprehensive final examination.

Plan Two—Students planning to complete the master's degree requirements under Plan Two must: (a) Be admitted to the Plan Two program; (b) Successfully complete an approved Basic Program of Study; (c) Successfully complete an approved extended program of study consisting of a minimum of 9 semester hours of courses numbered 500 or above, and submit an acceptable paper on 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 MSE Degree in Mechanical Engineering

All MSE students in the Mechanical Engineering Department are to be guided through one of two areas of concentration; each area has a core of three required courses. The mechanical engineering area requires EG 545, 561, and 649. The engineering mechanics area requires EG 554, 563, and 671. The remainder of the program and elective courses are to be chosen with the approval of the student's advisor. MSE students must enroll in the departmental seminar, EG 683, for one term and Ph.D. students must enroll for three terms.

Special Requirements for the 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 socioeconomic 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 instruction 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

A Ph.D. candidate must be admitted to the Graduate School before being admitted to the Ph.D. program. Admission is limited to those whose backgrounds show distinct promise of success in the program.

Examinations

A student must pass three examinations before being awarded the degree. They are:

1. The Preliminary Examination (or entrance examination) is a written test of the student’s capability to 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 the Graduate School. The Mechanical Engineering Department requires a minimum of three terms of seminar, EG 683, in addition to other requirements.

Transfer of Credits

Credits from other recognized institutions may be applied to the student's program of study if so approved by the student's advisory committee and by the Graduate School. These credits will generally not be evaluated until the student has been in residence study at UAH for at least one term and has passed the Preliminary Examination.

Advisory Committees

A faculty 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)

181 Energy and Man 4 hrs.
Introduces technical and social aspects of energy: history and projection of energy use in the U.S.; world energy natural resources; present and future technologies in generation, transmission, and storage; new forms of energy; energy conservation; future challenges; introduction to the engineering approach. Includes weekly laboratory demonstration or field trips. Prerequisite: MA 121 or Level II placement and one science course. (No credit to engineering juniors or seniors.)

195 Freshman Seminar 1 hr.
Required of all freshmen. Not open to upperclassmen.

196 FORTRAN Programming 2 hrs.
An introduction to FORTRAN programming for solving scientific problems. The course includes the basic concepts of digital computation, algorithms, flow charting. Practice in solving problems on the University computer is included. No credit to students who have completed MA/CS 113. Lab Fee: Level 3. Prerequisite: MA 121.

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.

220 Introduction to Production and Operations 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. Lab Fee: Level I. Not open to seniors.
270 Statics 2 hrs.
A study of forces and couples and the resultants of force systems, free-body-diagrams, equilibrium, problems involving friction, centroids, and moments of inertia. Prerequisite or parallel: MA 233.

An introductory course covering the structure of matter; basic concepts of phase transformations, mechanical, electrical, magnetic, and thermal properties; and corrosion. Approximately 1 semester hours of course work is devoted to laboratory experiments and 2 hours to lecture. Lab Fee: Level 3. Prerequisite: CH 121, PH 112.

300 Electrical Circuits I 3 hrs.
Electric and magnetic circuit concepts; transient and steady-state solution of simple circuits. Phasor analysis of ac circuits and network theorems. Prerequisite: PH 112. Prerequisite or parallel: MA 352.

301 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. Lab Fee: Level 3.

303 Electrical Engineering Laboratory 1 hr.
Experiments related to electrical circuits and to apply and verify the principles presented in EG 313. Lab Fee: Level 3. Prerequisite or parallel: EG 313.

305 Electronics Laboratory I 1 hr.
Experiments and reports related to amplifiers using bipolar, JFET, MOSFET devices. Emphasis is placed on original design of individual circuits. Lab Fee: Level 3. Prerequisite: EG 301 and must parallel EG 316.

307 Electricity and Magnetism (See PH 331) 3 hrs.
Basic concepts of electrostatics, electric potential theory, electric fields and currents, fields of moving charge including relativistic treatment, magnetic fields, Maxwell's Equations. Prerequisite: EG 363, MA 244, PH 112.

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 and CS 113 or EG 196. Same as CS 309. No credit for students who have had EG 502.

311 Electronics and Instrumentation 3 hrs.
A study of electronic devices such as solid state diodes and transistors, and their equivalent circuits; rectifying and amplifying circuits; ammeters, voltmeters and bridges; simple instrumentation systems and introduction to analog computers. Prerequisites: EG 300 and must parallel EG 301.

313 Electrical Circuits II 3 hrs.
Steady-state response to sinusoidal driving functions, polyphase circuits, transfer functions, resonance, magnetically coupled circuits; basic concepts of network topology and analysis, matrix formulation of network equations; algorithms. Prerequisite: EG 381.

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
Deals with economic evaluation of engineering alternatives. Topics include interest, depreciation, time-value of investments, learning curves, income tax break even and minimum cost analysis, and replacement analysis. Prerequisite: EC 142, MA 154.

341 Thermodynamics I
Study of basic laws of energy which apply in all branches of engineering and science. Topics include properties of matter, state variables, reversible processes, first and second laws of thermodynamics with applications to closed and open systems; availability of energy, and irreversibility. Prerequisites: MA 251, CH 121, PH 112.

342 Thermodynamics II
Continuation of EG 341. Topics include thermodynamic cycles, thermodynamic relations among properties, chemical reactions, and phase and chemical equilibrium. Prerequisite: EG 341.

352 Fluid Mechanics
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 363, MA 251.

359 Fluid-Thermal Laboratory
Laboratory in fluid mechanics, thermodynamics, and related areas. Typical experiments included are: flows in pipes and channels, flow control devices, verification of gas laws, compressible flow and engine performance and emission control. Lab Fee: Level 3. Prerequisites: EG 341, 352.

363 Particle Dynamics
Kinematics of a particle, Newton's laws, linear and angular momentum, work and energy, conservation laws, relative motion. Laboratory demonstrations are included. Prerequisite: EG 270, PH 111.

364 Kinematics and Dynamics of Machines
A study of plane and spatial rigid body motion including energy and momentum principles. Kinematics and dynamics of mechanisms and machines; graphical analytical methods of velocity, acceleration, and force analyses. Laboratory includes dynamic force and motion analysis, graphical mechanism synthesis, and dynamic balancing. Lab Fee: Level 3. Prerequisite: EG 363.

370 Mechanics of Materials
Theory of stress and strain; combined stresses; analysis of stresses and deformations in bodies loaded by axial, torsional, and bending loads; statically indeterminate members. Laboratory experiments and demonstrations included. Lab Fee: Level 2. Prerequisites: EG 270, MA 251; Prerequisite or Parallel: EG 294.

371 Structural Analysis I

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

378 Materials and Manufacturing Processes

213
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. Prerequisite: EG 300.

390 Probability and Engineering Statistics I 3 hrs.
An introduction to the engineering uses of probability theory, discrete and continuous probability distributions including the binomial, Poisson, hypergeometric, Gaussian, uniform, gamma, beta, log-normal, exponential, and extreme value distributions. Topics also include applications of statistical sampling, estimation, and hypothesis testing of means, variances and proportions. Prerequisite or parallel: MA 251.

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. Prerequisites: EG 196 and MA 352.

398 Selected Topics in Engineering Credit to be Arranged
Prerequisite: Permission of Instructor.

404 Electrical Networks Laboratory 1 hr.
Experiments that apply and verify the principles presented in EG 381 and 414. Lab Fee: Level 3. Prerequisite or parallel: EG 414.

406 Electronics Laboratory II 1 hr.
Experiments and reports related to electronic devices such as oscillators, multi-stage amplifiers, modulation and switching circuits; emphasis is placed on integrated circuits and micro-electronics methods. Lab Fee: Level 3. Prerequisite: EG 305 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. Lab Fee: Level 2. Prerequisite: EG 307 (PH 331).

411 Electric Power Systems 3 hrs.
Introduction to power generation, transmission and distribution; three-phase circuits and per unit analysis, load-flow studies, symmetrical components and power systems stability. Prerequisite: EG 313.

414 Passive Electrical Networks 3 hrs.
Driving point and transfer functions, frequency response of networks; introduction to filter theory and approximations for idealized network characteristics. Prerequisite: EG 313.

415 Introduction to Digital Computer Design 3 hrs.
Logic and electronic design of functional digital units, design of computer subsystems, flow of information and logical flow diagrams in timing and control; design of memory, arithmetic, and I/O units; binary and decimal machine arithmetic, design of a digital computer. Prerequisite: EG 309 or permission of instructor. Same as CS 415.

416 Electronics II 3 hrs.
Integrated circuits and micro-devices related to multi-stage amplifiers, oscillators, design specifications, operational amplifiers, and micro-circuits. Prerequisite: EG 313, must parallel with EG 406.

421 Probability and Engineering Statistics II 3 hrs.
A continuation of EG 390 with emphasis on regression analysis, analysis of variance, and non-parametric statistics. Includes introduction to design of engineering experiments, quality control, and computer solution of large scale problems. Prerequisite: EG 390.
Systems Analysis
An introduction to the philosophy and methods of industrial and non-industrial systems analysis. Methods of systems definition, analysis, simplification, methods of provision of control and information feedback, and methods of systems evaluation are presented and illustrated. A group design project is required. Prerequisite: MA 251 and senior standing.

Management Systems Analysis
A systems approach to the study of various formal organizational structures and functions. The informal organization is analyzed as to its function within the formal organization. Analytical techniques for making decisions within formal organizations are developed. Prerequisites: EG 220, 390.

Introduction to Heat and Mass Transfer
Study of the basic principles of heat and mass transfer; the application of these principles to problems in conductive, convective, and radiative heat transfer and mass transfer; both laminar and turbulent flow processes are included. One credit hour laboratory included. Lab Fee: Level 3. Prerequisite: EG 341, 352; Parallel: MA 352.

Analysis and Design of Energy Systems
Application of the principles of heat transfer, thermodynamics, and fluid mechanics to the analysis and design of systems for the storage and transport of energy. Topics include: heat exchangers, heat pipes, thermal storage systems, heating and air conditioning. Prerequisites: EG 341, 442.

Mechanics and Design of Machine Elements
Detailed design and selection of machine elements, such as gears, shafts and bearings. Topics include analysis of stresses and deformations under combined static and dynamic loads, stress concentrations, and fatigue. Prerequisites: EG 364, 370.

Structural Analysis II

Analysis and Control of Dynamical Processes
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 studies 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.

Analysis of Engineering Systems
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.

Introduction to Engineering Design
Study and application of basic design principles and concepts. Lecture topics include design methodology, decision making, creativity, product liability, pricing and profits, scheduling, patents, and others. Course work includes team design projects and the development of a proposal for a design project for implementation in EG 494. Prerequisites: EG 311, 341, 370.

Engineering Design
Continuation of EG 493 leading to the design of an engineering system. Lab Fee: Level 2. Prerequisite: EG 493, senior standing, and permission of instructor.

Selected Topics in Engineering
Credit to be arranged

Logic Circuits
Boolean algebra, binary, reflected, star and Karnaugh arrays; function representation,
reduction and realization by contacts and gates; one-to-one transformations at
subtransformations; symmetric switching functions with applications to adders, subtractors,
binary order detectors and applications. Prerequisite: senior or graduate standing. No credit
for students who have had EG 309.

503 Analog and Hybrid Simulation 3 hrs.
Principles of analog, digital and hybrid computation. Analog components for addition,
multiplication, integration and function generation. Analog computer simulation of systems
represented by linear and non-linear differential equation. Introduction to analog-digital
(Hybrid) simulation techniques. Laboratory sessions. Two credit hours for lecture and one
credit hour for laboratory work. Lab Fee: Level 3. Prerequisite: EG 311 and 381 or MA 35.

504 Instrumentation 3 hrs.
A study of measurement techniques and conventional and electronic instruments. Theory
construction, theory of operation, and proper use of bridge circuits, oscilloscopes,
transducers, and digital instruments. Lab Fee: Level 3. 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.

510 Selected Topics in Electrical Engineering 3 hrs.
Credit to be arranged

511 Machine & Assembly Language Programming* 3 hrs.
Assembly language programming in fixed wordlength computers; techniques in addressing
and machine control; data structures and data processing; use of subroutine linkages;
coroutines, pushdown lists, list processing, recursions and input-output subroutines; use of a
macro-assembly language; study of the organization and architecture of the University's
computer and its assembly language. Not open to students who have taken CS 308.
Prerequisite: CS 113 or EG 196. Same as CS 511.

*If the course taught used a computer system other than the system currently used on the
University campus, students completing this course must acquire proficiency in using the
University's computer before taking any other CS course which requires CS 511 as a
prerequisite.

513 Digital Computer Systems 3 hrs.
Examination of the architecture of selected third generation computers; organization of
various computer processors; study of computers with single and multiprocessor
environments; parallel processing; computer families. Prerequisite: EG 308 or EG 511. Same
as CS 513.

516 Digital Electronics 3 hrs.
Non-sinusoidal generating and wave-shaping circuits, timing circuits, limiters, comparators,
clampers, logic gates, multivibrators and voltage-controlled oscillators. Prerequisites: EG
316 and EG 502 or EG 309.

517 Data Structures 3 hrs.
Basic concept of data. Linear lists, sublists, strings, arrays, trees, queues, and stacks. Storage
systems and structures, and storage allocation and collection. Efficient algorithms for
creating, sorting, merging, searching structures data. Formal specification of data structures,
data structures in programming languages, and generalized data management systems.
Prerequisites: EG 308 or EG 511. Same as CS 517.
Digital Electronics Laboratory 1 hr.
Experiments and reports related to logic circuit realization of digital hardware. Emphasis is placed on RTL, D7, T7, ECL families for combinational and sequential switching circuits. Must parallel EG 516. Lab Fee: Level 3.

Logistics Planning and Control 3 hrs.
An evaluation of the basic nature of logistics systems. Since the engineering aspects of the production function are covered elsewhere, the emphasis is on the quantitative analysis of two networks and their interaction: the logical network for project planning and control, and the physical distribution network. Topics include charting, milestone method, line of balance, PERT-CPM, resource allocation and leveling, and maximum flow and minimum cost algorithms. Lab Fee: Level 2. Prerequisites: EG 390 or MN 502.

Statistical Quality Control 3 hrs.
A study of statistical theory and techniques used to control the quality of manufactured products. Prerequisite: EG 390.

Introduction to Ergonomics 3 hrs.
An introduction to the philosophy, methodology, and techniques related to the optimum design and analysis of man/machine/environment systems. A variety of laboratory equipment is utilized to simulate industrial problems in ergonomics. Lab Fee: Level 2. Prerequisite: EG 421.

Operations Research I 3 hrs.
An introduction to the philosophy and methodology of operations research. Specific techniques introduced are: Linear programming, inventory control, simulation, and replacement analysis. Prerequisite: EG 390.

Design and Analysis of Experiments 3 hrs.
Covers advanced topics in statistical experiments with emphasis on the design aspect. Topics include confounding, fractional replication, factorial and nested designs. Prerequisite: EG 421.

Systems Simulation 3 hrs.
Methods and procedures for simulation of complex systems. Both discrete increment and continuous time models are considered. Lab Fee: Level 4. Prerequisites: EG 196, 525.

Physical Properties of Fluids 3 hrs.
Development and study of theoretical, experimental, and correlation methods for determining and predicting the thermodynamic and transport properties of various fluids: critical properties, equations of state; vapor pressure and latent heat, heat capacity; viscosity, thermal conductivity, diffusion coefficients; phase equilibrium; heat and free energy for formation. Prerequisite: EG 342. Offered upon demand.

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.

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 341, 352.

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 and water pollution control. Prerequisite: EG 442.
<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>552</td>
<td>Energy Conversion and Power Generation</td>
<td>3 hrs</td>
<td>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, hydroelectric plants, windpower plants, and internal combustion engines. Consideration of engineering design and synthesis of typical systems including power requirements and economics. Prerequisites: EG 342, 352.</td>
</tr>
<tr>
<td>554</td>
<td>Advanced Fluid Mechanics</td>
<td>3 hrs</td>
<td>Development of the fundamental equations of fluid mechanics, with applications to two-and three-dimensional flows. Topics include stream functions, vorticity, potential functions, and viscous flows. Prerequisite: EG 352.</td>
</tr>
<tr>
<td>558</td>
<td>Dimensional Analysis and Similarity</td>
<td>3 hrs</td>
<td>Nature and use of dimensions; principles of dimensional analysis; systematic calculation of dimensionless products, algebraic theory of dimensional analysis, similarity and modeling testing; applications to problems of stress and strain, dynamics, fluid mechanics, theory of heat, and electrical phenomena; differential equations and similarity. Prerequisite: EG 352. Offered upon demand only.</td>
</tr>
<tr>
<td>559</td>
<td>Selected Topics in Mechanical Engineering</td>
<td>Credit to be arranged</td>
<td></td>
</tr>
<tr>
<td>561</td>
<td>Vibrations of Elastic Systems</td>
<td>3 hrs</td>
<td>Formulation of the equations of motion of discrete and continuous systems, analytical and numerical methods of solution, eigenvalue problems, and dynamic response. Prerequisite: EG 488.</td>
</tr>
<tr>
<td>563</td>
<td>Intermediate Dynamics</td>
<td>3 hrs</td>
<td>Newtonian and Lagrangian methods applied to particles, rigid bodies and mechanical systems. Topics include rocket thrust, orbital motion, and gyroscopic motion. Prerequisite: EG 364.</td>
</tr>
<tr>
<td>570</td>
<td>Mechanical Behavior of Engineering Materials</td>
<td>3 hrs</td>
<td>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 mechanisms and fracture. Strain rate, time to failure and cyclic life are treated from a microscopic viewpoint. Prerequisite: EG 294, 370.</td>
</tr>
<tr>
<td>571</td>
<td>Applied Mechanics of Solids</td>
<td>3 hrs</td>
<td>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 370.</td>
</tr>
<tr>
<td>579</td>
<td>Selected Topics in Structural Engineering</td>
<td>Credit to be arranged</td>
<td></td>
</tr>
<tr>
<td>601</td>
<td>Linear Systems</td>
<td>3 hrs</td>
<td>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.</td>
</tr>
<tr>
<td>602</td>
<td>Digital Computer Design</td>
<td>3 hrs</td>
<td>Digital arithmetic; logic matrices, redundant logic circuits; flip-flops, delayers, 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 309 or 502.</td>
</tr>
</tbody>
</table>
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. Lab Fee: Level 3. 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.

608 Electromagnetic Field Theory I 3 hrs.

609 Electromagnetic Field Theory II 3 hrs.
A continuation of EG 608. Prerequisite: EG 608.

610 Selected Topics in Electrical Engineering Credit to be arranged

611 Antenna Theory 3 hrs.
The study of antennas and antenna arrays. Radiation patterns and impedance characteristics. Analysis of spheres, cylinders, horns, slots, microwave lenses, traveling-wave, and frequency independent antennas. Prerequisite: EG 608.

614 Linear Graphs and Electrical Networks 3 hrs.
Introduction to linear graph theory with emphasis on applications to electrical network theory, classical network equilibrium equations, formulation of the state equations, topological formulas for network functions, signal flow graph method of circuit and system analysis. Prerequisite: EG 414.

615 Active Networks Synthesis 3 hrs.
Properties and synthesis of RC and LC networks, active network elements, RC active filter design, network sensitivity analysis, realization methods, approximation theory and filter design. Prerequisite: EG 414.

616 MOS Device Electronics 3 hrs.
The theory of MOS devices and circuit applications is presented. Particular attention is given to enhancement devices and digital circuits. Prerequisite: EG 516.

618 Microwave Techniques 3 hrs.

620 Engineering Management I 3 hrs.
A study of the principles of the executive process in technical organizations. Emphasis upon the basic management functions, scientific management, planning, directing, controlling, and decision making, as they relate to the management of technical organizations and the design and implementation of management systems. Prerequisite: graduate standing.

621 Statistical Methods for Engineers 3 hrs.
Designed to introduce graduate students to the applications of probability and statistics useful in research work. Includes descriptive statistics, theoretical distribution functions, point and interval estimation, tests of hypotheses, linear regression, and analysis of variance. Not open to students majoring in Industrial and Systems Engineering (except Engineering Management) or the MSOR program. Prerequisite: MA 251 and graduate standing.
622 Research and Development Management
Deals with those problems which are unique to the management of organizations engaged in R&D activities. Topics discussed include management control systems for R&D projects, motivation of technical personnel, problems of managing the creative person, means of increasing creativity, and the management of change. Prerequisite: EG 620.

623 Engineering Economic Analysis
Mathematical models for expenditure analysis under uncertainty. Relationship between investment decision criteria and microeconomic theory. Capital planning and budgeting. Decisions involving expansion, acquisitions, replacement, and disinvestment. Prerequisite: EG 421 or EG 621.

624 Advanced Ergonomics
Design, analyses and evaluation of man/machine/environment systems. Included are considerations of work space, environment, anthropometrics and simulation as related to optimization of man-system performance. Prerequisite: EG 524.

625 Operations Research II
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. Lab Fee: Level 4. Prerequisite: EG 421 and 525.

627 Introduction to Systems Engineering
An overview of engineering analytic methods applied to the design of operational, procedural, and hardware systems. The concepts of the System Life Cycle, and the Cost-Benefit and Tradeoff Analyses are developed. The use of engineering models of components, logic, signals, and organization in Systems Analysis is explained. Prerequisite: EG 505 or 506 or 525.

628 Engineering Management II
Deals with the organizational and human relations aspects of technical management. Formal and informal organizations, job satisfaction, motivation of employees, manager-employee relations, social behavior in the work situation and executive management functions as they influence the design and implementation of management systems. Prerequisite: EG 620.

629 Optimization Methods in Operations Research
A study of classical optimization theory with an introduction to search techniques. Topics include the Jacobian and Lagrangian methods, the Kuhn-Tucker conditions, quadratic programming, geometric and dynamic programming, and several search procedures. Lab Fee: Level 4. Prerequisite: EG 525.

631 Management Information Systems
Introduction to the design of integrated information systems necessary for effective management. Includes the methods of systems design, the basic concepts of computer processing systems, the design of management information procedures and, reports, and their application to mechanized and electronic data processing equipment. Prerequisite: EG 196 or CS 113.

632 Stochastic Systems
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 I
A study of industrial forecasting methods. Topics include simple forecasting models, multivariate regression, correlation, and spectral analysis, exponential smoothing, and Box-Jenkins forecasting. Lab Fee: Level 4. Prerequisite: EG 421 or EG 621.

634 Value and Decision Theory
A mathematical development of the decision making process. Statistical decision theory and
game theory applied to decision making under risk and uncertainty. Consideration of utility, benefit functions, opportunity loss and the value of additional information. Prerequisite: EG 525.

635 Linear Programming 3 hrs.
The application of linear programming to complex allocation problems. Methods for determining the maximum or minimum of objective functions whose variables are subject to constraints. Topics include simplex methods, degeneracy, modified simplex, transportation problems, network flows, goal programming, and sensitivity analysis. Lab Fee: Level 4. Prerequisite: EG 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.
Applications of classical thermodynamics with emphasis on treating problems involving nonideal gases and liquids, phase equilibrium, and chemical equilibrium. Prerequisite: EG 342.

645 Propulsion 3 hrs.
Aerothermodynamics of rocket propulsion systems; rocket propellants and combustion; heat transfer and cooling problems. Application to ramjets and hybrid systems. Prerequisite: EG 545. Offered upon demand.

646 Hydrodynamics 3 hrs.
Study of potential flow in two and three dimensions, potential and stream functions, vorticity; Laplace’s equation, singularities and distributions of singularities, complex potential, conformal mapping. Prerequisite: EG 554 and a course in vector calculus.

649 Transport Phenomena 3 hrs.
Mass, energy, and momentum transport in steady and transient motions in real and theoretical substances. Prerequisite: EG 442.

651 Direct Conversion of Energy 3 hrs.
The analysis and study of systems for the direct conversion of heat to electricity including thermionic, magneto-hydrodynamic, fuel cells, and semiconductor devices. Prerequisite: EG 641.

652 Introduction to Air Pollution Control 3 hrs.
An introduction to the technology of air pollution dealing with air pollutants, effects, sources, combustion processes, and abatement and control technology. Engineering contributions to both the problems and its solution. Nature of the air pollution problem and fundamental technological approaches to its solution. Prerequisite: graduate standing. Offered upon demand.

654 High Speed Flow Theory 3 hrs.
Transonic, supersonic, and hypersonic flows. Topics include: compressible potential flows, perturbation methods, similarity rules, characteristics, chemically reacting flows, and the blunt body problem. Prerequisite: EG 545.

656 Viscous Flow and Convective Heat Transfer I 3 hrs.
Navier-Stokes equations, including several exact solutions and several approximate solutions for both large and small Reynold’s number in incompressible flow. Free and forced convective heating. Application to laminar and turbulent flows. Prerequisite: EG 554.
659 Selected Topics in Mechanical Engineering
Credit to be arranged.

660 Theory of Vibrations
3 hrs.
Matrix treatment of systems with many degrees of freedom. Vibrations of elastic bodies. Nonlinear vibration of systems with single degree of freedom. Prerequisite: EG 561 or 563.

661 Advanced Dynamics
3 hrs.
Variational methods, optimization, and dynamic stability. Lagrangian and Hamiltonian formulation for dynamical systems and Hamilton-Jacobi theory. Prerequisite: EG 563.

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 563.

671 Continuum Mechanics
3 hrs.
Introduction to kinematics and kinetics, various coordinate systems, constitutive equations for continuous media; applications to boundary value and initial value problems. Prerequisites: EG 352, 370.

672 Theory of Elasticity
3 hrs.
Review of fundamentals. Formulation of the boundary-value problems of classical elasticity. Application to plane problems, prismatic members and axisymmetric problems. Prerequisite: EG 671.

674 Finite Element Analysis I
3 hrs.
Introduction to finite element theory, variational methods, weighted residuals; application to linear partial differential equations in continuous media; solution of boundary value and initial value problems. Prerequisite: EG 671.

676 Inelastic Behavior of Materials and Structures
3 hrs.
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 guages, brittle coatings, and analogies. Prerequisite: EG 571.

683 Graduate Seminar in Mechanical Engineering
No Credit
A minimum of one term is required of all MSE students in Mechanical Engineering and a minimum of three terms is required of all Ph.D. students in Mechanical Engineering.

690 Operating Systems
3 hrs.
Techniques of constructing operating system control programs including management of system, jobs, and data; multiprogramming, multiprocessing, and timesharing systems. Prerequisites: CS 517 Same as CS 690.

692 Graduate Engineering Analysis I
3 hrs.
Linear algebra, matrices and its applications to system of differential equations, vector analysis, integral theorems and introduction to tensor analysis. Prerequisite: MA 352.
Graduate Engineering Analysis II 3 hrs.
Fourier series, Fourier integrals, Laplace transformations, partial differential equations, boundary value problems, and special functions. Prerequisite: MA 352.

Master's Thesis 3 or 6 hrs.
Required each term a student is working and receiving direction on his master's thesis. A minimum of two terms and 6 hours required for M.S. students. A maximum of 9 hours of credit is awarded upon successful completion of the master’s thesis.

Sampled Data Control Systems 3 hrs.
Classical and modern methods for analysis and design of sampled data control systems: Z-transforms, transport lags, z and w plane analysis, state variables and the transition matrix. Prerequisite: EG 701.

Advanced Linear Control Theory 3 hrs.
Modern techniques for the analysis and design of linear control systems. Matrix formulation, multivariable control systems, state variable concepts. Linear transformation, controllability, observability, discrete-time systems. Prerequisite: EG 605 or permission of instructor.

Theory of Automata 3 hrs.
Linear automata, efficient and inefficient coders analyzed with Z-transforms and cyclotomic polynomials. State description of autonomous automata. Multilinear automata and various machines. Prerequisite: EG 415 or 502.

Theory of Programming Languages 3 hrs.
Syntactic analysis and semantic interpretation of formal languages and the associated compiler techniques as utilized in current procedure oriented compilers. Prerequisite: CS 603. Same as CS 703.

Nonlinear Control Systems 3 hrs.
Classical and modern methods for the analysis and design of nonlinear automatic control systems. State variables, phase plane, limit cycles, stability, describing functions, relay control, stabilization theory. Prerequisite: EG 701.

Theory of Optimal Control 3 hrs.
The general theory of optimal control of dynamic processes. Calculus of variations, Hamilton-Jacobi theory. Pontryagin’s maximum principle, dynamic programming. Prerequisite: EG 701 or approval of instructor.

Communication Systems 3 hrs.

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. (Offered alternate years).

Digital Signal Processing 3 hrs.
Theory and applications of signal processing by digital techniques. Topics include difference equations, z-transform theory, digital filter design, fast Fourier transform, quantization effects, and discrete estimation. Examples illustrate applications in digital filtering, signal processing, data analysis and smoothing, and image processing. Prerequisite: EG 606 or EG 614 or EG 605 or EG 602.

Selected Topics in Electrical Engineering Credit to be arranged

223
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>719</td>
<td>Advanced Electromagnetic Field Theory</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>721</td>
<td>Advanced Statistical Applications</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>729</td>
<td>Advanced Nonlinear Programming</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>730</td>
<td>Multi-criteria Decision Analysis</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>733</td>
<td>Industrial Forecasting and Analysis II</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>735</td>
<td>Discrete Optimization</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>736</td>
<td>Dynamic Programming</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>737</td>
<td>Advanced Simulation Modeling</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>739</td>
<td>Selected Topics in Industrial and Systems Engineering</td>
<td>Credit to be arranged</td>
</tr>
<tr>
<td>741</td>
<td>Statistical Thermodynamics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>747</td>
<td>Advanced Heat Transfer</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>752</td>
<td>Mechanics of Rarefied Gases</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>753</td>
<td>Magneto-Gas Dynamics</td>
<td>3 hrs.</td>
</tr>
</tbody>
</table>
and varying electric and magnetic fields, MHD shock waves and radiation effects. Prerequisite: EG 545.

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 545, 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**

3 hrs.

Development of theory and applications of nonlinear vibration phenomena, transient and steady state response of nonlinear systems. Prerequisite: EG 661.

762 **Wave Motion of Continuous Elastic Bodies**

3 hrs.

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**

3 hrs.

Advanced problems in aerospace vehicle rigid-body dynamics and stability are studied. Trajectory optimization for space navigation and related topics are included. Prerequisite: EG 661.

772 **Theory of Structural Stability**

3 hrs.


773 **Theory of Shells**

3 hrs.

The first-approximation theory of thin shells, higher approximations and transverse-shear deformations; geometrical nonlinearities and shell instability. Theories are illustrated by selected problems. Prerequisite: EG 671.

774 **Finite Element Analysis II**

3 hrs.

Advanced topics in finite element analysis; application to non-linear partial differential equations in continuum mechanics; theoretical studies of convergence and stability of solutions. Prerequisite: EG 674.

799 **Doctoral Dissertation**

3 to 6 hrs.
School of Nursing

Dean: Janet A. Pitts, Associate Professor of Nursing

The acceleration of social and technological change in society at large is reflected in changing patterns of nursing practice. Thus a theoretically oriented curriculum has been designed to meet the individual's goals, to prepare him to practice nursing now and in the future, and to progress to advanced study in either professional or academic graduate programs. It is believed that the student who learns to select scientific facts and theories from relevant disciplines for application to nursing practice will be able to adapt readily to changing modalities of nursing and medical practice.

Undergraduate Program

The graduate of The University of Alabama in Huntsville School of Nursing is prepared to assume responsible citizenship and satisfying personal relationships, as well as professional nursing leadership and practice in a setting of his choice. Through a planned system of advisement, the student may develop a minor field or a secondary area of concentration in nursing. An advisor will be assigned to each student to help guide him throughout the program. Students are urged to see their advisors at least once each term for approval of program. Some courses offered for credit in other departments may not carry credit applicable to the degree in nursing. 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.

Students transferring to The University of Alabama in Huntsville from other institutions should seek advisement from the School of Nursing at least six months prior to registration. 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, and nursing electives for which the prerequisites have been met. A maximum of eight semester hours of required senior nursing courses may be challenged with written permission of the Dean. Credit for at least one-half of the major nursing courses must be earned at UAH to complete requirements for the Bachelor of Science in Nursing degree.

226
Graduate Program

The School of Nursing offers the Master of Science in Nursing degree. It is a professional degree which builds upon the scientific base provided in part by the Bachelor of Science in Nursing degree.

The program is designed to provide the student with clinical experiences, which in combination with the science base, enables the graduate to engage in professional practice with focus on family nursing. Practice is designed to be generalized covering nursing care of the mother and infant, children, and adults as family constellations and as individuals.

The graduate of this program is prepared to assume a leadership role in the health delivery system. Each graduate is provided the opportunity to individualize his style of leadership and his professional role in advanced clinical practice, education, or administration.

A planned program of advisement will assist the student in selecting the required and supporting courses most appropriate to his personal and professional goals.

Health Service

The unique clinical experiences of students in the baccalaureate and graduate programs require a health surveillance program which is not necessarily applicable to other students in the University. The protection of their own health as well as that of their patients obligates the following regimen prior to any experience in patient-care agencies:

1. Health examination by a medical physician and dentist within two months prior to beginning the junior, senior and graduate years of study. The results of such examination must be submitted on forms provided by the School of Nursing at least two weeks prior to registration. Failure to submit the required reports will exclude the student from clinical practice.

2. Health 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.

3. Admission to patient-care agencies will depend upon satisfactory reports of mental and physical health status. Any disability which could affect the safety of patients (i.e. impaired hearing, vision, or mentation; communicable disease; etc.) will be considered cause for termination.

4. Students enrolled in clinical courses must be covered by malpractice insurance.

Responsibility to Agencies:

Students practicing in patient-care agencies are responsible for complying with all policies and procedures required by the agency. Failure to meet this requirement may mean that the student will be excluded from required practice which may prevent completion of the program.

Programs of Study

Professor: Crossland; Associate Professors: Baur (chairman, upper division), Lloyd (chairman, lower division), Pitts, Rubin; Assistant Professors: Anderson, Appleton, Ermert, Henze, Maines, Pearson, Perrin, Phillips, Sutphin, Warren, Williamson; Instructors: Copeland, Fordham, Heaman, McElroy, Moore, Neighbors, Pase, Wright.
**Baccalaureate Program**

**Lower Division**

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Natural Science and Mathematics:</strong></td>
<td></td>
</tr>
<tr>
<td>Natural Science (Biology, Chemistry, Physics)</td>
<td>12</td>
</tr>
<tr>
<td>Human Ecology (Phisiology, 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, Freshman Level (or Level II placement)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Social and Behavioral Sciences:</strong></td>
<td></td>
</tr>
<tr>
<td>Sociology and Psychology (Two courses in one of the fields and one course in the other field)</td>
<td>9</td>
</tr>
<tr>
<td>Electives</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total Lower Division</strong></td>
<td>26</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Humanities:</strong></td>
<td></td>
</tr>
<tr>
<td>English Composition</td>
<td>6</td>
</tr>
<tr>
<td>Literature or History (Two courses in sequence)</td>
<td>6</td>
</tr>
<tr>
<td>Electives</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total Humanities</strong></td>
<td>18</td>
</tr>
</tbody>
</table>

**Upper Division**

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nursing Major</strong></td>
<td></td>
</tr>
<tr>
<td>Bases of Nursing Practice</td>
<td>24</td>
</tr>
<tr>
<td>Episodic Nursing</td>
<td>8</td>
</tr>
<tr>
<td>Distributive Nursing</td>
<td>8</td>
</tr>
<tr>
<td>Nursing Roles in Delivery of Health Services</td>
<td>4</td>
</tr>
<tr>
<td>Independent Study</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total Upper Division</strong></td>
<td>48</td>
</tr>
<tr>
<td>Electives</td>
<td>18</td>
</tr>
</tbody>
</table>

**Summary**

A total of 128 semester hours of credit is required for the B.S.N. degree. Forty-eight semester hours of nursing in the upper division as specified in the Program of Studies constitutes the major area of concentration. Each student is guided by his assigned nursing faculty advisor to select a secondary area of concentration or a minor field of study which is consistent with the student’s goals and abilities.

The secondary area requires 18 semester hours of related courses which support an area of nursing practice. The secondary area of concentration must include at least 6 hours of upper division courses, 3 hours of which are nursing electives. If the student chooses a minor instead of a secondary area of concentration, the requirements of that department must be met.

A minimum of 60 hours of the required courses (including 20 hours of the sciences) must be completed before evaluation for progression into major courses in the upper division.
Graduate Program

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Nursing</td>
<td>12</td>
</tr>
<tr>
<td>Development of Nursing Theory</td>
<td>3</td>
</tr>
<tr>
<td>Pathophysiology</td>
<td>2</td>
</tr>
<tr>
<td>Seminar in Research</td>
<td>2</td>
</tr>
<tr>
<td>Thesis or Clinical Paper</td>
<td>3</td>
</tr>
<tr>
<td>Practicum</td>
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<td>Independent Study</td>
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<td>Electives</td>
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Summary

A minimum of 36 semester hours of credit is required for the M.S.N. degree. Twenty-four semester hours as specified in the program of studies are required in nursing. Additional hours may be added through appropriate electives.

The nursing graduate faculty offers courses in nursing to satisfy the requirements for the Master of Science in Nursing degree.

In addition to the Graduate School requirements, the requirements for the Master of Science in Nursing are:

1. Twenty-four semester hours of graduate work in nursing.
2. Completion of NUR 601 — Development of Nursing Theory and NUR 612 — Pathophysiology with a grade of B or better in each is necessary for progression into the remainder of the required nursing courses.
3. Nine additional semester hours of selected graduate courses in a related subject approved by the student's major advisor.
4. A minimum of 50 percent of all courses offered for the degree must be numbered 600 or above.
5. Masters thesis or clinical paper.

Admission

In addition to the requirements for admission to the School of Graduate Studies, the requirements for admission to the graduate program in nursing are:

1. Graduate of a National League for Nursing accredited baccalaureate program with a major in nursing.
2. Present evidence of a current license to practice as a registered nurse in Alabama.
3. Three letters of recommendation.
4. Have a 2.0 grade point average on a 3.0 scale in all undergraduate nursing courses.
5. One course in statistical concepts.
6. Personal interview.
7. Maintain a 2.0 grade point average in all nursing courses attempted.
Nursing (NUR)

233 Origins and Development of the Contemporary Profession of Nursing  3 hrs.
The emphasis of this course is on the historical development and present significance of nursing theory and practice. Current practice in modern nursing will be traced to their origins through library research and critical review of the literature. The impact of catastrophe, religion, technology, art, demographic change, science and other historical and social forces on the direction of nursing will be explored. Prerequisite: Sophomore standing.

301 Integration of Self into Systems  1 hr.
The emphasis of this experimental course will be on enhancement of self-awareness and exploration of thoughts, feelings, and behavior which will support transition into social and professional systems.

331 Nursing Care of the Person with a Long-Term Illness  3 hrs.
A study of the effects of long-term illness on the growth, development, and adjustment of a person and his family. Focus is placed on family-centered nursing intervention, emphasizing the best possible adjustment to alterations in family life style, and promoting high level wellness within the family. Elective. Prerequisite: NUR 381.

332 Nursing Care of Persons Experiencing Surgical Interventions  3 hrs.
A study of the effect of surgical intervention on the growth and development of the person and the subsequent adjustment of himself and his family. Focus will be on the family centered intervention prior to, during and after surgery. Emphasis will be on promoting the highest level of rehabilitation possible for the individual and his family. Elective. Prerequisite: NUR 381 and permission of instructor.

334 Death and Dying  3 hrs.
A consideration of death and dying in present time. Influences upon man's current attitudes and thinking gleaned from historical, cultural, philosophical and scientific perspectives. Focus will be placed on helping the individual student recognize intimate reactions and beliefs concerning death and identifying coping resources. Elective. Prerequisite: Permission of instructor.

335 Family-Centered Maternal-Infant Care  3 hrs.
The emphasis of this course is family-centered nursing for the expanding family. The focus is on the physiological as well as psychological effects of pregnancy on the family and the need for maintaining and promoting high level wellness in the family. Emphasis is particularly placed on preparation of the home and family for care of the high risk infant. Prerequisites: NUR 381, 382, and permission of instructor.

381 Bases of Nursing Practice, I  8 hrs.
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.

382 Bases of Nursing Practice, II  8 hrs.
Focuses upon critical employment of the nursing process in individualized, personalized care of patients in a variety of settings which includes family health. Prerequisite: NUR 381.

383 Bases of Nursing Practice, III  8 hrs.
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. Prerequisites: NUR 381 and 382.

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. Prerequisites: NUR 381 and permission of instructor.
431 Nursing Assessment of the Client's Health 3 hrs. 
Expands the role of the nurse by increasing depth in understanding and utilizing the skills of assessment in developing a nursing history and performing a nursing assessment of the health of selected clients. Elective. Prerequisite: NUR 383 or current registered nurse license to practice in Alabama and permission of instructor.

433 Nursing Care of Patients with Cardiovascular Problems 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. Elective. Prerequisites: NUR 481 and 482 and permission of instructor.

435 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 NUR 481 by providing clinical applications as well as expansion of the theoretic base of psychiatric nursing. Elective. Prerequisites: NUR 481 and 482 and permission of instructor.

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. Prerequisites: NUR 381, 382 and 383.

443 Nursing Roles 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. Prerequisites: NUR 381, 382, and 383.

481 Episodic Nursing 8 hrs. 
Nursing patients with complex medical, surgical and psychiatric conditions requiring episodes of hospitalization. Prerequisites: NUR 381, 382, and 383.

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. Prerequisites: NUR 381, 382, and 383.

500 Special Topics 3 hrs. 
Advanced study of underlying sciences and personal experiences in application of skills in a selected area of interest in nursing.

600 Professional Practice 3 hrs. 
The emergence of professional nursing practice and thought will be studied to provide a base for assessing the state-of-the-art and for planning for future development. Emphasis will be given to family nursing practice.

601 Development of Nursing Theory 3 hrs. 
The concepts of theory and theory building are explored in seminar and practiced in a clinical setting. The course focuses on implications of theory building for nursing practice and its application to research in nursing.

602 Seminar in Research 2 hrs. 
Seminar sessions that will provide the student an opportunity to identify, explore, and critique current nursing theory and research for the purpose of enabling the student to think inquiringly and critically; and, to utilize theory and scientific methodology to formulate a proposal for investigation or research.

603 Thesis or Clinical Paper 3 hrs. 
This course is designed for the application of the research or investigative process with faculty
guidance. The student will research or investigate a nursing problem and prepare an appropriate written report.

612 Pathophysiology  2 hrs.
Building on previous knowledge of anatomy, physiology, adaptation and disease process, the course will provide an opportunity for the student to increase his understanding and identification of anticipated and existing physiological alterations as they affect the individual and the family. Pathological aspects affecting each stage of human development will be examined and compared with normal physiology on both the macro and microscopic levels.

621 Family Nursing Care of Mothers and Infants  4 hrs.
Advanced nursing theory and clinical practicum that provides the opportunity for the student to assume responsibility for providing nursing care and anticipatory guidance promoting health for mothers and infants within the context of the family constellation.

622 Family Nursing Care of Children  4 hrs.
Advanced nursing theory and clinical practicum that provides the opportunity for the student to assume responsibility for providing nursing care and anticipatory guidance promoting health for children within the context of the family constellation.

623 Family Nursing Care of Adults  4 hrs.
Advanced nursing theory and clinical practicum that provides the opportunity for the student to assume responsibility for providing nursing care and anticipatory guidance promoting health for adults within the context of the family constellation.

624 Advanced Nursing Clinical Practicum  2 hrs.
The student will assume total nursing responsibility for selected families. Discussion and guidance will be provided by the responsible medical and nursing faculty members. This course will provide the student the opportunity to synthesize and apply learning from relevant courses and experiences.

625 Teaching Practicum  2 hrs.
The student will have faculty guidance in planning and teaching clinical nursing to selected students. Emphasis will be placed on use of evaluation for corrective and creative progress.

626 Supervision and Administrative Practicum  2 hrs.
The student will have faculty guidance in supervising and/or directing the activities of nursing personnel in selected health service settings. Self-evaluation and the evaluation of the performance of others will be emphasized.

633 Theories of Curriculum and Nursing Instruction  3 hrs.
Theories of curriculum instruction and evaluation will be examined in their implication for theoretical and clinical teaching in nursing. The course is designed to be a corollary for NUR 625 Teaching Practicum.

650 Independent Study  2-4 hrs.
The student will plan, implement, and evaluate an in-depth study of the related phenomena observed in nursing practice which are of special interest to him. A selected faculty member will serve as a resource person and as responsible instructor.
Library Research for Undergraduates

Director of Libraries: John Warren, Assistant Professor of Bibliography

Courses in bibliography are offered as electives only, neither forming nor contributing to a cluster; nor do they contribute to the certification requirements for teacher-librarians. No credit toward the General Education Requirements is obtained.

### Bibliography (BIB)

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<tr>
<th>Course Code</th>
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<td>Introduction to Library Research</td>
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<td>An introduction to the organization of university libraries and their collections, the use of major reference sources, and the techniques of successful research.</td>
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<td>380</td>
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385  Bibliography of Art  1 hr.
Library research methods in the subject; its production, organization and utilization of
information; its reference and research materials. Alternate years.

400  Theory of Bibliographical Order  2 hrs.
General structures of systems of bibliographical order: hierarchical trees, "alphabetical" files,
juxtaposition and syndesis, facet analysis, thesauri. Prerequisite: BIB 100 or admission to an
MLS program.
School of Primary Medical Care

Acting Dean: Silas W. Grant, Professor of Family Medicine

Director of the Family Practice Residency: Charles T. Moss, Jr., Associate Professor of Family Medicine

Director of Medical Student Affairs: Donald V. McCalister, Professor of Medical Sociology

Director of Ambulatory Care Administration: David Lee Kohr, Adjunct Instructor in Community Medicine

Clinic Manager, Ambulatory Care Center: Walter W. Montgomery

Coordinator for Communications: Thalia K. Haak

Assistant to the Dean for Educational Resources: Gary J. Bell

Assistant Librarian, Health Sciences Library (SPMC Component, UAH Library): Carolyn Slayden

Consultant to the Dean for Computer Utilization: Bernard J. Schroer

Instructional Units

Community Medicine
Professor: Bishop (chairman); Assistant Professors: Figarola, Freeman; Adjunct Instructor: Kohr

Clinical Faculty: Family Practice: Blackwell, Bradley, P.M. Christian, N. Christopher, R. Christopher, Hall, Letson, Merryman, Underwood, Weatherly; Health Administration: Johnson, N. Thompson; Internal Medicine: Hood, Norwood; Occupational Medicine: Dye, Roan; Public Health: Gay, Shook, Vaughan

Dermatology
Adjunct Associate Professor: Clabaugh

Clinical Faculty: Holliman, Parker
Family Medicine
Professor: Grant; Associate Professors: Moss, H.T. Smith (chairman); Assistant Professors: Coleman, Dowd, Figarola, McCarthy; Adjunct Assistant Professors: Fleming, Frierson, Kinzer

Clinical Faculty: H. Anderson, Sr., Baker, Basore, Boggess, Brown (Clinical Assistant Professor), Cale, Cauthen, P.A. Christian (Dentistry), Daniel, Dempsey, Ditoro, English, Gray, Grote, Hamm, Kates, Martinic, Pewitt, Rhyne, J. Rice, Robertson, Rose, Rowe, Rutledge, Sammons, Striplin, I. Thompson, Williams

Emergency Medicine: Armstrong, Kratz

Internal Medicine
Professor: Sparks (chairman); Adjunct Assistant Professor: Burson; Visiting Assistant Professor: Franco-Browder
Clinical Faculty: H. Anderson, Jr., Arrington, Boyer (Neurology), Cowart, Finch, Huber, Hull (Neurology), Jackson, Knox, Lary, Marcus, Plott (Neurology), Rogers, Tietke, Watson

Medical Sociology
Professor: McCalister

Obstetrics and Gynecology
Professors: Corner, Harris (chairman); Assistant Professor: Shapiro
Clinical Faculty: Alison, Bramm, Bryan, Cameron, Crowson, Owen, Reece, Reynolds, R. Rice, Sheppard, A.H. Smith, Warren, Wells, Wheeler, Willice

Pathology
Assistant Professor (P/T): Litkenhous (chairman); Lecturer: Keebler

Clinical Faculty: Butler, Canale (Clinical Assistant Professor), Lampert, B.S. Moore, Shasteen

Pediatrics
Professor: Montgomery (chairman); Adjunct Associate Professor: Howie; Assistant Professors: Fleming (Psychology), Wong; Adjunct Assistant Professors: Hinton, Lester, L. McKenzie, Ploussard, Quirante (Neonatology), Stewart; Research Assistant Professor (P/T): Sloyer; Instructor: Eisenfeld

Clinical Faculty: Bordenca, Eich, Hale, Isley, Lyrene, McGehee, Meigs, Miles, Packard, Patterson, Peeler, Ray (Clinical Associate Professor), Sutherland (Allergy), Townsley, Upchurch, Wood, Wouters

Psychiatry
Professors: Froelich (chairman), Ritchey; Instructor: Abbott; Lecturer: Adams
Clinical Faculty: Abele, Bess, Calhoun, Goodson, Haney, Lewis, Liddon, Perrin, Rinn (Clinical Psychology)

Radiology
Adjunct Assistant Professor: T. McKenzie (chairman)
Clinical Faculty: Booher, Bryson, Camp, Campbell, Gibson, R.P. Griffith (Radiation Therapy), Hewett, McCormick, Ray, Young

Surgery
Assistant Professor (P/T): Laughlin (chairman); Adjunct Assistant Professors: Berg, Black, Kakani, Selah, W. Walker

Clinical Faculty: Akin, Carlisle, Cotter, Griggs, McDonald, F. Smith, Whitley, Wright, Yu

Anesthesiology: McCraney, Mosley
ENT—Otolaryngology: Maxwell
Neurosurgery: Bell, Haws, Maccubbin
Ophthalmology: Maynor, R. Moorman, Wilson
Orthopedics: Beck (Clinical Assistant Professor) Burnside, Horn
Plastic Surgery: Burlison, G. Walker
Urology: Britt, Carter, T. Griffith

The Clinical Faculty is drawn from practicing physicians and other active health professionals in North Alabama.

The School of Primary Medical Care of The University of Alabama in Huntsville is a community-based clinical component of the University of Alabama System Medical Education Program. The UAH School of Primary Medical Care offers a clinical education program (the final two years of medical school).

Under the present University of Alabama System plan, freshman medical students are admitted to the Medical Center at Birmingham, where they take their Correlated Basic Medical Science training. Students may take their clinical clerkships and electives at either the Birmingham, Huntsville or Tuscaloosa campuses. All students who satisfactorily complete their course work in the University of Alabama System Medical Education Program at any of the Program's three component campuses are awarded diplomas from the University of Alabama School of Medicine.

Correspondence pertaining to admission to the tri-campus University of Alabama System Medical Education Program should be addressed to: Director of Admissions, University of Alabama School of Medicine, 1600 8th Avenue South, University Station, Birmingham, Alabama 35294. Students or prospective students at UAH who are interested in Pre-Medical or Pre-Dental baccalaureate programs are referred to the preprofessional advisor in the School of Science and Engineering through the office of the Dean of the School of Science and Engineering.

Through the School of Primary Medical Care, The University of Alabama in Huntsville jointly offers with Huntsville Hospital a three-year Residency in Family Practice, qualifying residents for certification by the American Board of Family Practice. The residents are employees of UAH but the program is jointly funded by the University and Huntsville Hospital.

Goals

The UAH School of Primary Medical Care acts on a concept of primary health care as personal care, involving a one-to-one relationship with a health professional; first contact care of unselected patients whose health problems have not yet been evaluated by a physician; comprehensive care of the total person in the context of his family and community; continuing care to assure health maintenance, involving patient and physician in an on-going partnership managed by the physician and drawing on whatever
medical and non-medical resources and personnel are required.

While family physicians, pediatricians, and general internists make the heaviest commitments to primary care, any physician who provides the four elements of care just described is functioning in a primary care role — a role not limited to a given medical specialty.

**Mission Statement**

A. It shall be the mission of the School of Primary Medical Care, in concert with the goals and objectives of The University of Alabama in Huntsville, to develop and maintain:
   1. An undergraduate clinical program for 25 students in each of the two clinical years that will provide a superior clinical training experience and will demonstrate the primary care disciplines as viable career options.
   2. Residency training programs in the traditional primary care disciplines with the objective being to contribute practicing physicians to meet the needs of Alabama.
   3. A continuing medical education program to provide the members of the medical care team in North Alabama an opportunity to stay abreast of advances in patient care.

B. In addition to traditional biomedical research, the School of Primary Medical Care shall undertake and report research in the socio-economic areas related to medicine and to health care in general.

C. Documentation and continuous monitoring of the quality of patient care shall be a major goal of this program.

D. The mission, goals, and objectives of The University of Alabama System Medical Education Program (UASMEP) as stated below shall be a part of the mission, goals, and objectives of the School of Primary Medical Care.

The goals and priorities for the faculty and the curriculum of the UASMEP, as set forth by the Executive Dean, are as follows:

1. Care of the patient as the primary value. To instill in the student a value system oriented to the care of the patient. To instill a respect for the dignity and integrity of man, whatever his status in life, his possession or lack of power, his race, or creed, or locus of origin. To instill and nurture in the physician a sympathetic desire for the patient to be well and healthy. To attempt to guarantee that the physician will always place a high value on his own trustworthiness as a physician to the individual patient.

2. Emphasis on biology. To educate the student to be a supremely capable expert in human biology giving recognition to the fundamentally biological nature of the human organism. This should not preclude an adequate appreciation of the unique place of reason and spirit in man and of the complexities and problems of human organizations and their impact on health, especially the family and the organization of health care delivery. However, in a medical education, human biology must remain paramount.

3. Physician as a scholar. To make natural the continuing education of the student after he has graduated from medical school, especially and most essentially in medicine itself, but in other forms of intellectual activity as well, for the maintenance and improvement of skills and continued growth of the whole physician.

The place of the faculty in this endeavor is at least four-fold: example, motivation, facilities, and guidance:

1. Example. Children copy their parents in a very detailed manner, younger students imitate many of the characteristics and attitudes of their teachers, and medical
students imitate their professors to a great degree. Providing good role models for students to emulate is a function of the school.

2. Motivation. This can be both positive (rewards) and negative (punishments). Formal tests and evaluations (i.e., grades) and adequate feedback to the students are helpful as intermediate level motivations, in addition to the ultimate motivators of passing or failing. To attempt to conduct a course of education without these is both unwise and unfair to the students.

3. Facilitation. Providing laboratories, lecture material, audiovisual aids, computer assisted instruction, biological material for dissection, the opportunity to participate, under proper supervision, in the clinical care of patients, and similar aids to learning is a traditional and necessary function of the school.

4. Guidance. Orientation of the student directing him to aids, helping determine relative importance, and helping weed out the unimportant are all essential faculty activities.

In addition, the School of Primary Medical Care resident and student programs and the School's continuing education programs for physicians and other professionals emphasize the following components:

a. Diagnostic and therapeutic assessment of a broad range of clinical problems affecting persons of either sex and in all age groups.

b. Knowledge of modern epidemiology, not only for infectious diseases, but also for chronic, malignant, genetic, and degenerative conditions.

c. Knowledge of the interrelationship of biological, psychological, sociological, and cultural variables in the health of an individual.

d. Knowledge and utilization of all available health professionals and community resources in the interest of the patient (consultation and referral).

e. Ability to maintain a professional therapeutic relationship with large numbers of patients representing a broad spectrum of personality types, behaviors, and clinical problems.

f. Practice organization and management, including the creation of a viable health care team and the application of technology to the administration and business aspects of practice.

g. Knowledge and utilization of one's self as a therapeutic agent, and the ability to avoid and/or manage the known biological and psychosocial hazards of the physician's vocation.

Programs

Student Medical Education

The two-year clinical program of the School of Primary Medical Care completes the qualifications of students for the M.D. degree and for taking the Part II Examination of the National Board of Medical Examiners. The special focus of the program is on general clinical competencies in medicine, pediatrics, obstetrics and gynecology, surgery, and psychiatry that will qualify a student for graduate training in disciplines having a heavy commitment to primary medical care, including but not limited to family practice, internal medicine, pediatrics, and obstetrics and gynecology. It is intended that a student completing the program will be qualified to enter any approved residency in the United States.

The clinical experiences are oriented toward the primary care emphasis on comprehensive health maintenance, behavioral medicine, continuity of care, and consideration of the family as a unit of health care. In general, both the core and elective experiences involve a combination of inpatient and outpatient assignment, the latter
including clinic and private office experience. Clinical conferences appropriate to each specific core clerkship and elective are scheduled as ongoing conference series dedicated to the primary care emphasis of the total program.

Each student is assigned to a practicing family physician for one half day weekly throughout his junior year in Huntsville. These volunteer physician-advisors, selected by the School of Primary Medical Care in conjunction with the local Medical Education Committee, serve as personal mentors, advisors, and preceptors to the students.

Required clerkships in the clinical program include:

- Obstetrics & Gynecology
- Pediatrics
- Medicine
- Surgery (Gen. & Spec.)
- Psychiatry
- Community Medicine
- Dermatology
- Family Medicine

The core clerkships are primarily based in Huntsville Hospital but also include two distinctive longitudinal elements each requiring one half day per week:

1. Each student is assigned patient families to be seen in his or her physician-advisor's office. The student spends one-half day per week in the office practice throughout his junior year with increasing responsibility for the coordination and delivery of comprehensive care to his families. This experience is supervised and evaluated jointly by the advisor and medical school faculty.

2. Weekly conferences and seminars covering topics of clinical and professional importance which are not included in the core clerkships are held throughout the core clinical experience. Faculty from all clinical programs participate as well as invited guest lecturers. The topics include a review of clinical skills, social sciences in medicine, medical ethics, reviews of clinical physiology, and professional growth seminars.

The clinical electives offered by the UAH School of Primary Medical Care are characterized by:

1. In most offerings, a one-to-one faculty-student relationship;
2. Experience with both hospital and ambulatory patient care;
3. Experience in early diagnosis of illness;
4. Through private practice exposure, experience in the non-medical aspects of health care and practice that are frequently not taught in the formal curriculum.

Clinical Clerkship in Family Medicine
Family Practice Preceptorships in North Alabama

Senior Sub-Internship in Medicine
Clinical Elective in Medical Oncology
Clinical Elective in Dermatology
Clinical Elective in Gastroenterology
Clinical Elective in Nephrology
Clinical Elective in Neurology

Senior Sub-Internship in Pediatrics
Clinical Elective in Private Pediatric Practice
Clinical Elective in Pediatric Allergy
Research Elective in Clinical Immunology

Senior Elective in Obstetrics and Gynecology
Clinical Elective in Obstetrics and Gynecology

Clinical Elective in Psychiatry
240
Senior Sub-Internship in General Surgery
Clinical Elective in Anesthesiology
Clinical Elective in Orthopedics
Clinical Elective in Ophthalmology
Clinical Elective in Plastic & Reconstructive Surgery
Clinical Elective in Neurological Surgery
Clinical Elective in Neurosurgery and Neurology
Clinical Elective in Ear, Nose, and Throat Surgery
Clinical Elective in Thoracic and Cardiovascular Surgery

Senior Elective in Clinical Pathology

Clinical Elective in Radiology and Nuclear Medicine
Clinical Elective in Radiation Oncology

Field Research Elective in Health Behaviors
Research Elective in Social Factors in Human Reproduction

Community Medicine Preceptorship
Elective in Public Health Laboratory Procedures
Elective in Use of Vital Statistics
Elective in Activities of a Public Health Agency
Elective in Health Care Administration
Clinical Clerkship in Occupational Medicine

Clinical Elective in Emergency Medicine

During the clinical electives, the student works in both hospital and office settings at the discretion of the physician-supervisor, who extends graduated responsibility for student participation in the care of private patients.

Family Practice Residency

The Family Practice Residency combined program of The University of Alabama in Huntsville and Huntsville Hospital was the first approved residency in family practice in the state of Alabama and the first residency program of any kind to be implemented in Huntsville. The purpose of the residency is to aid the developing physicians in acquiring the knowledge, skills, and attitudes necessary to become proficient family physicians and to create an atmosphere in which they can provide families with comprehensive health care on a continuing basis under the supervision of experienced family physicians. In acknowledgement of the need for continued medical education to maintain professional excellence, residents will be encouraged to develop habits of learning and understanding that will help them to assimilate current health care information for the duration of their careers.

The residency training program is based in the UAH Family Practice Center, which is located in the SPMC Ambulatory Care Center across the street from the main building of Huntsville Hospital. The Ambulatory Care Center is a microcosm of a complete primary health care delivery system and is an equal partner with the hospital as a base for learning. As such, it encompasses both models of primary physician office practices and community resources essential to continuing comprehensive care.

The largest hospital in North Alabama, Huntsville Hospital is a non-profit city and county controlled institution with sophisticated, systems-oriented management and a
diversified medical staff. Because of its capacity and specialized facilities, Huntsville Hospital serves as a regional referral health care center for northern Alabama and southcentral Tennessee. The governing board and administration of Huntsville Hospital have played a crucial role in establishing the Family Practice Center with UAH and in planning for the participation in the care of hospitalized patients by residents and medical students.

The curriculum for family practice residents is divided into three phases. The first 18 months constitute Phase I. During this time the resident receives in-depth hospital experience in Medicine, Pediatrics, Surgery, Obstetrics and Gynecology, and Emergency Service. Rotations in Neurology, Urology, Orthopedics, and Psychiatry are combined hospital and specialty office experience. One-half day each week is spent in the Family Practice Center seeing patients under the guidance of the full-time Family Practice faculty. These patients are assigned to individual residents and form the core of their private practices which they will be following through the entire three years of the program.

Phase II, the next twelve months, is spent mainly in Family Practice. Patients are seen daily in the Family Practice Center, and those needing hospitalization are admitted to the Family Practice Service in Huntsville Hospital. Rounds are made each morning with discussion of all patients preceding the patient visits. Residents are rotated through specialty clinics in the Ambulatory Care Center. A required two-month Family Practice Preceptorship with a clinical faculty member in North Alabama provides an opportunity for actual practice under conditions similar to those which will be encountered in the resident's own practice. The last six months, or Phase III, is individually designed to allow the resident time in specific areas or electives of special interest or special need to him.

Underlying the entire three-year curriculum is continued emphasis on behavioral science training and experience as it applies to Family Practice. A full-time nutritionist and a full-time social worker are available at all times. Developmental learning consultation is also included. An on-going noontime conference schedule and a Thursday afternoon non-clinical teaching experience make up the remainder of the program.

Further information on the UAH-Huntsville Hospital Family Practice Residency Program is available from: Charles T. Moss, Jr., M.D., Director of the Family Practice Residency, Ambulatory Care Center, 201 Governors Drive, S.W., Huntsville, Alabama 35801.

Resources and Facilities

In all aspects of its work, the UAH School of Primary Medical Care depends heavily on the active cooperation of the hospitals and medical professionals of North Alabama. The quality of medical facilities and personnel in this area was one of the basic reasons for locating the School of Primary Medical Care at The University of Alabama in Huntsville. University departments representing the humanities and behavioral sciences, computer sciences, engineering, and business administration constitute resources for consultation and support that are particularly relevant to the needs of primary health-care education and delivery.

The UAH Ambulatory Care Center is a unique multipurpose educational laboratory for the programs of the UAH medical school. The building has been arranged, staffed, and equipped to facilitate demonstration of how primary physicians' office practices, consultant services, and community resources may be integrated in order to provide continuing comprehensive care to individuals and families.

The area of the building devoted to health services on a fee-for-service basis includes a number of practice modules, each with its own examination and consultation rooms, nursing station, supply room, and waiting room. The modules are staffed by teams of
faculty, residents, medical students, nurses, co-professionals, nursing students, and secretary-receptionists.

The Ambulatory Care Center also has a clinical laboratory, a full-scale radiographic unit, an ambulatory surgical unit, a physical therapy service, and a pharmacy. Patients can be referred to a clinical nutritionist and/or a social worker within the same building. The computerized problem-oriented medical record/business information system makes readily available not only a coordinated over-all view of a patient's health history, but also data for research in epidemiology, health-affecting behavioral patterns, the doctor-patient relationship, and practice management.

The major library holdings for the School of Primary Medical Care are housed in the Clinical Science Center in the Huntsville Medical District. This location makes these library collections conveniently available to community physicians and other health professionals as well as to medical students, residents, and faculty.

Through the UAH Library, of which it is a component, the School of Primary Medical Care Health Sciences Library has access to the Redstone Scientific Information Center at Redstone Arsenal. In addition, the professional staff of the Health Sciences Library works closely with library staff and services at Huntsville Hospital, the Lister Hill Library in Birmingham, the A. W. Calhoun Memorial Library at Emory University in Atlanta, and the National Library of Medicine in Bethesda, Maryland. The MEDLINE terminal makes available to the faculty and other members of the Huntsville medical community on-line searches through the data base of the National Library of Medicine.

The UAH Library is a member of NABIN (North Alabama Biomedical Information Network), which facilitates the rapid exchange of biomedical information among libraries and other member informational units in the top tier of counties in North Alabama. NABIN interrelates with similar consortia in other areas to provide access to biomedical information resources around the world.

All aspects of the education of physicians through the School of Primary Medical Care 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 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.
School of Graduate Studies

Dean: N.F. Audeh, Professor of Electrical Engineering

The graduate programs of The University of Alabama in Huntsville provide a learning experience in which the student further develops intellectual capabilities through advanced studies. These studies are characterized by a greater degree of independence 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. It is the student's responsibility to be acquainted with all requirements related to a desired program and for fulfilling these requirements.

The graduate degree is based on a program of studies designed to accomplish a specific intellectual or professional goal. This program of studies should be planned by the student at the earliest appropriate time (see specific degree programs) with the counsel of a faculty advisor. The program includes advanced studies in subject matter areas, and in most cases a research phase in which the student demonstrates capabilities for independent scholarly work.

The University of Alabama in Huntsville offers the following graduate degrees:
Master of Administrative Science (MAS)
Master of Arts (MA)—Developmental Learning, English, History, Mathematics
Master of Science (MS)—Biology, Chemistry, Computer Science, Physics
Master of Science in Engineering (MSE)
Master of Science in Nursing (MSN)
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 unclassified, provided that the student meets the qualifications outlined for probational admission.

UAH Seniors

A UAH senior may, with permission of the Graduate Dean, pursue graduate work while completing undergraduate degree requirements if the student has:
1. Fewer than 13 semester hours remaining to be taken.
2. An overall undergraduate average or an average on the last 60 hours of at least 2.0
3. A total course load of less than 12 semester hours.

Application Procedure

Applicant must submit: (1) Completed graduate application form (available in Admissions and Records Office); (2) Non-refundable application fee of $15. In addition, the student must request the following items to be sent to UAH Admissions and Records Office: (1) Two copies of previous academic records from each collegiate institution attended; (2) Scores of the Graduate Record Examination (GRE) from Educational Testing Service (ETS).

All application materials are to be submitted to 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.

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.

An applicant to a PhD program who has been previously admitted to the Graduate School of The University of Alabama in Huntsville must submit a completed reevaluation form to the UAH Admissions and Records Office.

Requirements For Admission

An applicant 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.)

Unconditional 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, if specified by the major department. Applications may be obtained at the UAH Admissions and Records Office.

Students applying for admission to Graduate School may be admitted on a probationary basis, based on a minimum score of 50 on the Miller Analogies Test. (Administered and graded locally.)

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 the applicant has taken the Graduate Record Examination or the Miller Analogies Test. The applicant must meet one of the following requirements: (1) A quality point average of at least 1.5 (A=3.0) overall or (2) A score on the aptitude portion of the GRE of at least 1,000 or (3) A quality point average on the last 60 hours of at least 2.0 or (4) A score on the Miller Analogies Test of at least 50.
Non-Degree Graduate Students

A student interested in earning graduate credit, but who is not an applicant to a graduate degree program at The University of Alabama in Huntsville, may be admitted as a non-degree graduate student and be continued on a term-by-term basis. Admission in this category may be granted to students submitting evidence of at least a bachelor's degree from an accredited institution. The student must maintain the same QPA grade requirements expected of the probationally admitted graduate student. Courses taken while in this category must have prior approval by the department offering the course and the Graduate Dean.

Credit earned under a non-degree graduate status may be applied toward a graduate degree program at The University of Alabama in Huntsville following admission to the graduate degree program and approval of the courses by the major department. If the student, based on the previous record, is admissible to the graduate program, then the student may by petition, apply up to 12 semester hours toward the degree. If the student is not admissible, the non-degree graduate credit may be considered in lieu of irregular post-graduate requirements.

Change in Major

A student previously admitted to the Graduate School of UAH to pursue a degree program offered in one department may be admitted to a degree program in another department if the student meets the current admission criteria of the latter department.

Irregular Post Graduate Status

A person whose application to the Graduate School has not been approved 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. (Limited to accumulated total of 15 semester hours).

Upon completion of 12 or more semester hours of advanced level courses with an average grade of B or better, a student may reapply for admission to the Graduate School. Evaluation of the application will include the demonstrated performance in the advanced level courses. In this case, an applicant may be admitted probationally if acceptance is recommended by the appropriate academic department.

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, or the departmental chairman if a student does not have an advisor. (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 apply to 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.

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. A student admitted on a probationary basis who has an overall grade average of B or better for all graduate work attempted up to and including the term in which 12 semester hours are completed assumes the status of an unconditionally admitted student. 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 is not a candidate for a degree.
3. Probationary status is removed by raising the overall grade average to B or better on all graduate work attempted in all terms up to and including the term in which 12 semester hours of graduate work are completed following the term 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 the major department and approval by the Graduate Dean.

**The Master's Degree**

To avoid wasted effort, students are encouraged to plan a Program of Study before the completion of 12 semester hours with the help of a faculty advisor. Courses taken without an approved Program of Study may not apply toward the degree. Students may follow one of two plans to satisfy the requirements for the master's degree except where noted by some departments.

**Plan One**

Degree requirements under this plan include completion of 24 or more semester hours of graduate course work and the writing of an acceptable thesis.

The thesis should show evidence of the student's capacity for research and independent thought, as well as an ability to interpret materials used and to write in clear, acceptable English. The subject must be in the major field and 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 department at least four weeks before the date on which the candidate expects to receive the degree. At least ten days before graduation three copies of the thesis, approved by the thesis committee, the dean of the major school, and the Graduate Dean, along with a receipt for the binding fee ($13.00) must be deposited in the UAH Admissions and Records Office. Theses must comply with the regulations set forth in the *Guide for Preparation of Theses and Dissertations at The University of Alabama in Huntsville* which is available at the UAH Admissions and Records Office.

In exceptional cases, theses may be written in absentia. To obtain permission for such action, the student, before leaving the University, must select a thesis subject and submit to the chairman of the major department a satisfactory outline of the thesis, plus satisfactory evidence that adequate facilities are available where the work is to be done.

**Plan Two**

Degree requirements for the master's degree under this plan include the completion of a minimum of 33 semester hours of graduate course work. A thesis is not required. The degree requirements may be met with a minimum of 30 semester hours of graduate course work if the student enrolls full time (6 to 10 semester hours per term) for at least three terms.

A candidate working under Plan Two may be required to participate successfully in seminar or problem courses for acquaintance with methods of research and an appreciation of the place and function of original investigation in the field.

**Transferred Credit**

With the permission of the 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. The student may also petition the 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 has an overall average at the institution of B or better. Students who have graduate credits from another campus of the University of Alabama must complete a minimum of 12 semester hours of acceptable graduate credit at UAH to receive a master's degree from UAH.

**Candidacy for the Master's Degree**

A student admitted to a Master's degree program is a candidate for the Master's degree provided the student (a) is not on probation, (b) has an approved program of study on file in the Office of Admissions and Records, (c) has an average of B or better on all graduate work attempted at UAH, and (d) has met all admission requisites.

**Time Limit**

All requirements for the master's degree should be completed in not more than six years. Credit for individual graduate courses completed at 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. A student may take such an examination to validate a particular course only once.

Second Master's Degree

A student is permitted to apply no more than six semester hours of credits earned for one graduate degree toward an additional master's degree at UAH at the discretion of the major department.

Examinations

In addition to the regular course examinations, a final comprehensive examination is required of all candidates for the master's degree. This examination may be written, oral, or both. If a thesis is submitted and a written examination is given, there will be an oral examination which may be limited to the thesis. The candidate will be examined on the major subject or subjects and thesis in Plan One and on the course work in Plan Two. The oral examination is conducted by a committee of at least 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. 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, designed by the student and a faculty committee. The program includes mastery of certain tool skills (languages, computer programming, statistics, and others approved by the Graduate Council) as appropriate, and an independent research project, the results of which are presented in the form of a dissertation.

The following specific degree requirements are applicable to all PhD degree programs within the University. Additional requirements may be imposed by individual departments as shown in this catalog under the appropriate department.

Application Procedure

Students applying for admission to the Graduate School should follow the application procedure previously outlined. 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 the 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, but no later than the end of the first year of study. After approval, the program may only be amended by the Supervisory Committee.

Transferred Credit

All credit toward the 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 completion of 12 semester hours in one language with a grade average of “B” or better; 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 the evaluation of the student's investigative abilities, independent thought, and scholastic progress by faculty members other than the 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 minimum. Therefore, as a general requirement, each student shall have successfully completed at least three academic years of residence beyond the bachelor's degree; at least one of the three academic years shall have been 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/her research proposal for the dissertation.

Qualifying Examination

The Qualifying Examination is given under the auspices of the Supervisory Committee. The examination is a demonstration of proficiency in the subject matter phase of the program of study and 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 supervisory committee and the appropriate department, and is approved by the Graduate Dean. It is the responsibility of the student to secure the appropriate forms from the Office of Admissions and Records and to initiate the procedure for admission to candidacy at least six months 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 graduation. At least ten days before graduation three copies of the dissertation, approved by the student’s committee and the chairman of the major department, and a receipt for the binding fee ($13.00) must be deposited in the UAH Admissions and Records Office. Dissertations must comply with the regulations set forth in the Guide for Preparation of Theses and Dissertations at The University of Alabama in Huntsville, which is available at the UAH Admissions and Records Office. Approval by the Graduate Dean is necessary before graduation.

Application for Degree

Each candidate for a PhD degree must apply for the degree through the UAH Office of Admissions and Records during the term in which all remaining requirements for the degree are to be met, but at least two months before it is to be conferred.
Final Examination

The final examination is an oral presentation of the thesis before the student's committee and is open to the members of the University community in the form of a seminar.

Cooperative Ph.D. Programs

Close cooperation on Ph.D programs exists between departments on the UAH Campus and departments on the Tuscaloosa Campus authorized for carrying on doctoral work. Applicants to programs in mathematics and chemistry who desire to make maximum 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 the Supervisory Committee with appropriate approvals at the other University.

A student earning a master's degree or a six-year degree at either institution must complete at least one-half of the required course work at the institution granting the degree.

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 the Graduate Dean.

The Deans of the Graduate Schools will serve as liaison officers in arranging programs for which the additional hours may be transferred and other details.
Division of
Continuous Education

Director: C. Michael Oliver

General Studies
Adjunct Assistant Professors: Faraci, Mikell, Tremul

Administrative Studies
Adjunct Assistant Professors: Baudendistel

Technical Studies
Adjunct Associate Professors: Head, Humphries

The mission of the Division of Continuous Education is to apply university-level capabilities in meeting educational needs of persons at all age levels. This mission is fulfilled through continuing education and public service activities as well as special programs that supplement the standard offerings at UAH. The following sections describe the post-secondary instructional activities of this Division.

General Information

The Division of Continuous Education offers credit and non-credit courses, conferences, seminars, and institutes in a variety of subjects to provide for individual enrichment and professional advancement. Primarily intended for adults, these offerings are given so as to be convenient for the greatest number of intended attendees. Many classes are scheduled in the evenings and on a short-term basis. Preliminary efforts are now being made in the use of educational television and independent study. Special technical and management courses are given in facilities of industrial and governmental organizations. Working in association with the other elements of UAH, courses drawn from the standard academic programs are given in extension.

Admission and Credit

Applications for non-credit courses may be completed during registration. In general, these courses are open to all adults, but prerequisites are necessary for certain advanced courses. UAH now grants continuing education units (c.e.u.) in recognition of satisfactory completion of non-credit courses. The c.e.u. is the standard adopted by colleges and universities for offerings that do not have academic credit. Permanent c.e.u.
records for students are maintained by the Continuous Education Division.

Persons desiring to have credit earned through the Continuous Education Division applied in regular academic programs should be admitted to UAH and register as regular students. However, credit may also be pursued by registering as a non-matriculated student. Credit earned in the non-matriculated category remains on file with the Continuous Education Division. If the student later is admitted as a regular student, the credit may be accepted into the regular records, subject to the standard regulations governing transfer credit. Requests for transfer of credit earned as a non-matriculated student should be submitted in writing to this division.

The application to enroll as a non-matriculated student may be completed at the time of registration. No transcripts or other credentials are required. A non-matriculated student must certify that he or she is (1) a high school graduate or has a satisfactory score on the GED, (2) has the stated prerequisites for the course desired, and (3) is not under current suspension from another institution.

Offerings Available

Some courses are given on a periodic basis, but many of the offerings are designed to meet current needs or interests. Consequently, the offerings available vary considerably with time. Brochures describing the offerings during various periods are available. Persons interested in receiving these brochures should contact the Continuous Education Division. Inquiries concerning the development of special courses are invited.

Fees

Full-term credit courses offered by the Division of Continuous Education follow the fee schedule of UAH and students may include these courses under the maximum fee structure. Short-term, off-campus, or non-credit offerings are not applicable to these fee conditions. Fees for such courses vary and are announced prior to each offering.

Associate Certificate Programs

Many individuals have a need for an organized program of study at the university level, but do not feel that the baccalaureate is a practical goal. This is particularly true for mature adults who are beginning or reentering their studies on a part-time basis. For these persons, UAH has developed associate certificate programs in selected areas. Credit earned in the associate certificate programs may also be used, where applicable, toward fulfilling requirements for a bachelor’s degree, and students completing the associate certificate are encouraged to continue work toward the baccalaureate.

General Requirements

Students in the associate certificate programs must be admitted to UAH and are subject to all of the standard academic regulations of this institution. Overall requirements for the associate certificate are as follows: (1) Complete 60 semester hours credit, including 24-26 hours in general education requirements, 30 hours in a specific curriculum of specialty and supporting courses, and the remaining hours in free electives; (2) Earn an overall average of C in (a) all courses attempted and (b) all specialty courses attempted.
Transfer students must earn at least 18 semester hours, including 6 hours in specialty courses, in classes through UAH and must complete 6 of the last 9 hours credit through this institution. In addition to the overall grade average, transfer students must earn an average grade of C in (a) all courses attempted at UAH and (b) all specialty courses attempted at UAH.

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

The general education requirements for the associate certificate include 24 to 26 semester hours credit as follows:

1. English Composition, 6 hours in (a) EH 101 and EH 102, or (b) CLEP English Composition Examination.
2. History-Social Sciences, 6 hours in (a) HY 101 and HY 102, or (b) history, sociology, psychology, political science, or economics courses or examination, or (c) CLEP Social Sciences-History Examination.
3. Science-Mathematics, 6-8 hours in (a) mathematics, biology, physics, chemistry, or natural science courses or examinations, or (b) CLEP Natural Sciences Examination, or (c) CLEP Mathematics Examination.
4. Humanities, 6 hours in (a) EH 205 and EH 206, or (b) English, modern foreign languages, philosophy, music, or art courses or examinations, or (c) CLEP Humanities Examination.

Students who intend to continue their studies toward the baccalaureate are cautioned to select general education courses that will also apply toward the requirements for the higher degree. In each of the above groups, the courses listed as “a” are acceptable in most bachelor’s degree programs at UAH.

Child Development

This curriculum is primarily intended for persons working in, or preparing for work in, preschool programs other than those in public school. The Associate in Child Development Certificate will be awarded upon completion of the general requirements with 30 semester hours in specialty and supporting courses as follows.

Specialty Courses: CD 101 and CD 203 required; minimum of 9 hours from CD 102, CD 201, CD 202, CD 301, and CD 302.

Supporting Courses: SOC 100 and PY 103 required; remaining hours from ART 215, MU 215, ED 215, ED 230, ED 263, and ED 495.

Other courses may be substituted with permission from the child development program coordinator.

Law Enforcement

This curriculum is primarily intended for in-service law enforcement officers and persons preparing for work in this field. A baccalaureate program with law enforcement as a cluster is described under Criminal Justice, School of Humanities and Behavioral Sciences.

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 271, SOC 320, and SOC 420.

Other courses may be substituted with permission from the law enforcement program coordinator.

**Interior Decoration**

This curriculum is intended for persons preparing for work in an associate capacity in interior decorating and for those desiring personal enrichment in this field.

The Associate in Interior Decoration Certificate will be awarded upon completion of the general requirements with 30 semester hours in specialty and supporting courses as follows.

**Specialty Courses:** ID 101, ID 102, and ID 202 required; minimum of two courses from ID 197, ID 201, and ID 309.

**Supporting Courses:** ARH 101 and ARS 121 required; remaining hours from studio art (minimum of two ARS courses or one ARS course if ID 197 is taken) and art history (including one advanced ARH course).

Other courses may be substituted with permission from the interior decoration program coordinator.

**Basic Certificate Programs**

The basic certificate programs are primarily for persons who are not interested in pursuing an associate certificate or a bachelor's degree but desire an organized curriculum in a specialized area at the university level. The programs should be of particular interest to a person who has completed an undergraduate program of study but needs basic training in a new specialty.

Overall requirements for a basic certificate are as follows: (1) Complete 30 semester hours credit, including 3-6 hours in written and oral communications and the remaining hours in a specific curriculum of specialty and supporting courses; (2) Earn an overall average of C in (a) all courses attempted and (b) all courses attempted at UAH.

Transfer students must earn at least 12 semester hours in classes through UAH, and must complete 6 of the last 9 hours credit through this institution. Up to 15 semester hours of the total requirements for the basic certificate may be earned by means other than classroom work (e.g., CLEP, credit by examination, correspondence study, educational experiences in the armed forces, and professional certificate programs).

**Post-Graduate Certificate Program**

Obsolescence in professional personnel is critical and must receive continuous attention if the United States is to maintain its economic and technological leadership. To help combat professional obsolescence, UAH offers the Post Graduate Certificate
Program. Departing from tradition, this program combines some of the best features of continuing education courses and traditional, advanced study to provide fully credited, organized curricula to keep professional personnel proficient in their fields.

Admission

All participants in the program must hold at least a bachelor’s degree from an approved institution. However, quality point averages will not be a factor in determining acceptance, and the Graduate Record Examination will not be required. The field of specialization in the program will be determined by the student’s needs and will not be limited to that of his prior academic area of concentration; however, 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.

Requirements

Requirements for earning the post-graduate certificate are 15 semester hours credit in an approved curriculum of 500-level and above courses, with a quality point average of at least 1.0 on all courses attempted. To be applicable, credit must not be more than six years old at the time of certificate completion, and at least six semester hours credit must be earned after registering for the program with the Division of Continuous Education.

Curricula

In the field of administration, programs may be selected for post-graduate certificates in the following areas: General Administration, Program Management, Contract Administration, Industrial Administration, Logistics Management. In technical areas, programs may be selected in the following: General Technology, Sensor Systems, Electronics Technology, Aero-Mechanical Technology, Computer Technology.

Each curriculum will include one or more core courses to establish the area of specialization; the remaining courses will be selected in accordance with individual requirements. The curriculum for each student must be approved by an advisor.

Courses may be drawn from the special 500-level offerings of the Division of Continuous Education and from the regular offerings of other departments. Offerings from the Continuous Education Division will be presented in both short-term and standard periods. Major courses will be given in both formats during each year.

Post-graduate credits earned in the University of Alabama System prior to entering the program may possibly be used in a curriculum. Up to six semester hours credit might be transferred from institutions not in the system. However, all such credit is subject to the six-year limitation and must fit into an approved curriculum.

Relationship to Graduate School Programs

There is an overlapping of courses appropriate for both types of programs. It may be possible for students to apply credit earned in the post-graduate certificate program to
requirements for a master's or doctoral degree. For this, the course must be approved for graduate credit and the student must be fully admitted to Graduate School prior to pursuing the course. Further, the student's graduate advisory committee must approve each specific course and will control the admission of credit earned while pursuing the post-graduate certificate.

The admission requirements of the UAH Graduate School are very specific, directed toward the academically talented student. However, it is recognized that some very capable persons did not demonstrate this talent in prior studies. Such persons may be considered for admission to Graduate School after completion of 12 semester hours in advanced courses with a grade of B or better. Courses from the post-graduate certificate program may be an excellent means of pursuing this credit. Students intending to use the credit for this purpose are advised to consult with the department responsible for the desired graduate program as to the acceptability of specific courses.

Non-Credit Certificate Programs

In addition to the academic certificate programs, the Division of Continuous Education offers certificate programs based on non-credit courses. These programs are open to any adults; however, the level of instruction is directed toward persons with at least a high-school background or the equivalent.

At the present time, programs are available in Small Business Management and in Supervisory Management. Each curriculum requires four non-credit courses. Brochures describing these programs are available from the Division of Continuous Education.

Listener's License Program

The Division of Continuous Education, with the cooperation and participation of academic departments throughout The University of Alabama in Huntsville, offers the Listener's License Program to interested individuals in the community. The objective of this program is to make the resources of knowledge, skill, and artistry of the University available to all members of the surrounding community.

This program is designed to benefit a variety of individuals. These include:

1. Individuals at, or approaching, retirement age who desire further education in preparation for the change within themselves as well as those in their life style;
2. Individuals who need to acquire or maintain the skills necessary to adjust to the rapidity of changes in business and professional fields;
3. Younger individuals who will, in the near future, be making a career choice; and
4. Individuals who seek educational enrichment as a means of increasing their enjoyment of life.

Participants in the Listener's License Program will be allowed to sit in on University classes for a fee of $25 per course. They will be passive participants and will not be allowed to take part in class discussions, testing, etc., unless participation is invited by the course instructor.

Registration will be accomplished through the Division of Continuous Education. Records on Listener's License participants will also be maintained by the Division. (No academic or c.e.u. credit is awarded to involved participants.)

Courses attended under the Listener's License Program cannot be challenged for credit unless full tuition for the class is paid. Participants must be at least 16 years of age and/or a high school senior. Students under disciplinary or academic suspension are ineligible to register as Listeners.
Declaration of Intent (DOI)

The DOI Form is a document prepared cooperatively by student and a responsible advisor in the Division of Continuous Education. All students pursuing Certificate Programs (including Basic and Associate Certificate Programs in Child Development, Interior Decoration, and Law Enforcement; Post-Graduate Certificate Programs; and Non-Credit Certificate Programs) are required to consult with an advisor and complete the DOI Form after completion of the second course taken at UAH.

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)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Introduction to Child Development</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>102</td>
<td>Child Nutrition and Health Care</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>201</td>
<td>Creative Activities</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>202</td>
<td>Language Development</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>203</td>
<td>Teaching the Young Child</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>301</td>
<td>Preschool Programs and Centers</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>302</td>
<td>Preschool Practicum</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>A structured program of observation and participation in a preschool center. Prerequisite: 12 semester hours in CD courses, including CD 101.</td>
<td></td>
</tr>
</tbody>
</table>
### Interior Decoration (ID)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Fundamentals of Home Furnishings</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Introductory survey of furnishings for the home. Design terms; styles of furniture; basic decoration methods including furniture arrangement, elements of color, window treatment, accessories, and lighting; and customer buying of furniture, floor coverings, fabrics, and wall coverings.</td>
<td></td>
</tr>
<tr>
<td>102</td>
<td>Introduction to Interior Decoration</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Introduction to the principles and practices of interior decoration. Activities and space planning; principles of design; color theory and schemes; interior materials; design of major interior elements; and examination of the whole house including floor and furniture arrangements, exterior considerations, and cost factors. Prerequisite: ID 101 or permission of coordinator.</td>
<td></td>
</tr>
<tr>
<td>197</td>
<td>Drawing and Rendering</td>
<td>2 hrs.</td>
</tr>
<tr>
<td></td>
<td>Drawing techniques for illustration in interior decoration. Investigation in expressive and objective drawing styles in the professional media. Free-hand sketching, perspective studies, rendering techniques, and composition in line, form, value, and color. Same as ARS 197.</td>
<td></td>
</tr>
<tr>
<td>201</td>
<td>Introductory Architectural Planning</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Survey of architectural planning and drawing, primarily as these topics relate to interior decoration. Basic drawing and sketching; planning processes for home and light-commercial buildings; construction materials; elements of construction methods; introduction to preparation of architectural drawings.</td>
<td></td>
</tr>
<tr>
<td>202</td>
<td>Interior Decoration Problems</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Detailed study of selected problems in interior decoration. Practical applications in combining furniture, accessories, materials, and finishes; development of a portfolio of materials; ethics in commercial interior decoration. Prerequisite: ID 102.</td>
<td></td>
</tr>
<tr>
<td>309</td>
<td>Period Styles</td>
<td>3 hrs.</td>
</tr>
<tr>
<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. Same as ARH 309.</td>
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</tr>
</tbody>
</table>

### Law Enforcement (LE)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Introduction to Criminal Justice</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></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>
<td></td>
</tr>
<tr>
<td>102</td>
<td>Law Enforcement Operations</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></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>
<td></td>
</tr>
<tr>
<td>201</td>
<td>Investigation and Evidence</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></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>
<td></td>
</tr>
<tr>
<td>203</td>
<td>Introduction to Criminalistics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Introductory survey of the scientific approach to criminal investigation. Definition and scope of criminalistics; physical evidence and probability; equipment for investigation; collecting</td>
<td></td>
</tr>
</tbody>
</table>
physical evidence; nature of physical evidence; laboratory operations and techniques; the expert witness. Prerequisite: LE 101, introductory science desirable.

The following courses are open to students who have completed LE 101 (or the equivalent) or who have upper-division standing.

301 Crime and Delinquency 3 hrs.
A detailed study of crime and delinquency in the United States: quantity, measurement, trends, economic impact, and victimization. Examination of the nature and impact of organized crime. Prerequisite: LE 101 or permission of instructor.

303 Criminal Law 3 hrs.
A study of substantive criminal law. Principles of criminal law; theories of legal defenses; crimes against the person and property; offenses against public morality and decency; offenses against the sovereign, public peace, and maintenance of order.

304 Criminal Procedure 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 3 hrs.
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.

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 and SOC 102, or SOC 100 and approval of instructor. (Same as SOC 320.)

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.

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 102 or SOC 100 and approval of instructor. (Same as SOC 420.)

Life Support (LS)

A group of courses is being developed in the Division of Continuous Education designed to up-date the medical professional and inform the general public of new techniques used in life-saving and support. The number shown is for credit registration. All of the courses will also be available as non-credit.

101 Cardiopulmonary Resuscitation 1 hr.
A course designed to provide the student with the cognitive and psychomotor skills needed to perform cardiopulmonary resuscitation on an infant or adult who has suffered respiratory and cardiac arrest. Teaching strategies and principles are emphasized to enable participants to teach basic life support to others.
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 a bachelor's degree.

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.

522 Contract Management 3 hrs.
Study of governmental procurement processes, nature of various types of contracts, and management of contract performance. Primarily for R&D technical and managerial personnel.

523 Configuration Management 3 hrs.
Study of the needs, concepts, and applications of configuration identification, control, and status accounting as related to hardware and documentation.

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.

525 Planning and Control Techniques 3 hrs.
Study of the management methodology of network-based planning and control; detailed analysis of CPM, PERT, and GERT; computer procedures for complex networks.

541 Fundamentals of Contract Administration 3 hrs.
Intensive survey of the principles and practices involved in the administration of contracts by and from federal agencies.
Legal Aspects of Contracts
Study of Governmental procurement laws and regulations, contract construction and interpretation, patents and copy rights, and the Uniform Commercial Code.

Financial Aspects of Contracts
Study of contract pricing techniques; financing of government contracts; allowable, disallowable, and allocable costs; indirect rate determinations; accounting methods; contract closings.

Contract Changes and Terminations
Detailed study of laws, regulations, and procedures pertaining to contract changes, supplemental agreements and change orders, stop work orders, terminations, and government contract liabilities. Prerequisite: MN 522 or 541 or equivalent.

Contract Negotiation
Detailed study of contract negotiation by and with governmental agencies with an emphasis on interfaces among the technical, administrative, and financial operations. Prerequisite: MN 522 or 541 or equivalent.

Fundamentals of Public Administration
Intensive survey of the principles and practices involved in the administration of governmental organizations.

Fundamentals of Industrial Administration
Intensive survey of the principles and practices involved in the administration of industrial organizations.

Industrial Personnel Administration
Study of personnel administration in an industrial organization: selection, training, and placement of personnel; merit training and promotion; salary and wage administration.

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

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

Fundamentals of Logistics Management
An intensive survey of the management principles and practices involved in the general field of logistics.

Maintenance Management
Detailed study of the problems of product support and the maintenance of complex systems. Maintainability is related to the interacting effects of such factors as design engineering, reliability, technical documentation, and spare parts provisioning.

Inventory Management
Intensive study of the principles and techniques involved in the management of inventory. Topics include functions and lot size, identifying problems, forecasting, inventory control systems, and techniques to reduce inventory and backlogs.

Distribution Management
Detailed study of an integrated physical distribution system. The subsystems of transportation, warehousing, inventory control, materials handling, industrial packaging, order processing, and location analysis are studied under a total systems approach and cases.
Modern Technology (MT)

The following courses all require a knowledge of basic calculus and assume a background equivalent to a bachelor's degree in engineering, physics, or a similar field. Additional prerequisites are as noted.

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 application.

513 Guidance Technology 3 hrs.
Intensive survey of trajectory theory, stability and control theory, guidance and optimization theory, and modern guidance techniques and systems.

514 Rocket Propulsion Technology 3 hrs.
Intensive survey of rocket propulsion theory, techniques, systems, and components. Appropriate for both specialists and non-specialists. Prerequisite: knowledge of basic thermodynamics.

515 Instrumentation Technology 3 hrs.
Intensive survey of the theory and application of modern electronic instruments and instrumentation systems. Appropriate for engineers and scientists in all fields.

516 Laser Technology 3 hrs.
Intensive survey of laser principles and systems with an emphasis on practical aspects, particularly in space and military applications.

517 Nuclear Technology 3 hrs.
Intensive survey of the principles of nuclear energy, nuclear power systems, nuclear weapons, radiation effects, and radiation shielding.

518 Simulation and Modeling Technology 3 hrs.
Intensive survey of simulation methodology with applications to systems analysis and synthesis. Prerequisite: basic knowledge of computer programming.
519 Digital Electronics Technology 3 hrs.
Intensive survey of the analysis and design of digital logical circuits using discrete and integrated elements. Prerequisite: knowledge of basic electronic circuits.

520 Heat Transfer Technology 3 hrs.
Intensive survey of heat transfer theory, applications, and devices, particularly as related to missiles and spacecraft. Prerequisite: knowledge of basic thermodynamics.

522 Remote Sensing Technology 3 hrs.
Intensive survey of principles and techniques of sensing characteristics of the earth and its environment by remote means.

523 Image Processing Technology 3 hrs.
Intensive survey of the theory, hardware, and application of optical and digital image processing, coding, and transmission. Prerequisite: basic knowledge of data processing.

524 Communication Systems Technology 3 hrs.
Intensive survey of theories and techniques involved in analog and digital communication systems. Prerequisite: knowledge of basic electrical theory.

525 Optics Technology 3 hrs.
Intensive survey of the principles of optics and their applications in modern devices and systems.

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 processing; tracking algorithms; and clutter reduction techniques. Prerequisite: MT 554 or considerable experience in radar systems.
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Nan G. Hall, B.S., M.A.S. ............... Director, Admissions and Records; Registrar
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David L. Kohr, B.A., M.B.A. ............ Director, Ambulatory Care Administration
Charles T. Maples, Jr., A.B., M.A., Ph.D. .......... Dean of Students
Gerry Moore, B.S. ....................... Director, Personnel Services
Jane E. Nelson, B.A. ..................... Director, Office of News & Publications
C. Michael Oliver, B.S., M.S., Ed.D. .... Director, Division of Continuous Education
Frances C. Roberts, B.S., M.A., Ph.D. ........ Director, Academic Advisement & Information Center
Bernard J. Schroer, B.S.E., M.S.E., Ph.D. Acting Director, Johnson Environmental & Energy Center
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K.O. Thompson, B.S., B.A.E., B.B.A., M.S., Ph.D. .... Director, Institutional and Research Support Services
Walter C. Vice, B.S. ...................... Director, Auxiliary Services

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.)

ABBOTT, LYNNE C., B.A. (Sangamon State University), M.S.W. (University of Tennessee). Instructor in Psychiatry, 1976.

ADAMS, CURTIS H., B.S. (Mississippi State University), M.S.Ed. (Henderson State Teachers College), Ph.D. (Mississippi State University). Associate Professor of Biology, 1965.


ANDERSON, KAY T., R.N. (Georgia Baptist Hospital), B.S.N. (The University of Alabama in Huntsville). Temporary Instructor of Nursing, 1976.

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; Dean, School of Graduate Studies, 1964, 1972.

BARNARD, WILLIAM D., A.B. (Birmingham-Southern College), M.A., Ph.D. (University of Virginia). Adjunct Associate Professor of History, 1977.

BAUENDISTEL, RONALD L., M.A.S. (The University of Alabama in Huntsville). Adjunct Assistant Professor of Modern Administration, 1975.

BAUR, MARIAN K., B.S.N. (Emory University), M.S.N. (University of Alabama in Birmingham). Associate Professor of Nursing, Chairman, Upper Division 1972, 1977.

267


BEASON, R. TOM, B.S. (University of Alabama, University), C.P.A. Adjunct Instructor of Business Administration, 1977.

BERG, ERNESTINE H., B.S., M.D. (University of Louisville). Adjunct Assistant Professor of Surgery, 1977.


BISHOP, F. MARIAN, B.A. (Drury College), M.S. (University of Kansas), M.A.Ed. (Syracuse University), Ph.D. (Washington University), M.S.P.H. (University of Missouri). Professor of Community Medicine; Chairman, Community Medicine Programs, 1974.

BLACK, J. KENDALL, B.S. (University of Alabama, University), M.D. (Medical College of Alabama). Adjunct Assistant Professor of Surgery, 1976.


BOOHER, PETER, B.A. (Vanderbilt University), M.D. (Emory University). Adjunct Assistant Professor of Radiology and Chairman for Radiology Programs (P/T), 1977.


BOYER, D. ROYCE, B.M. (Butler University), M.A. (Catholic University of America), D.M.A. (University of Texas at Austin). Professor of Music; Chairman, Department of Music, 1966, 1977.

BRAINERD, JEROME J., B.S., M.S. (University of Notre Dame), Ph.D. (Cornell University). Associate Professor of Aerospace Engineering; Chairman, Department of Mechanical Engineering, 1965.


BROWN, ROBERT A., B.S. (U.S. Naval Academy), M.S., Ph.D. (Ohio State University). Professor of Industrial and Systems Engineering; Chairman, Department of Industrial and Systems Engineering, 1967.

BRUMETT, ROBERT E., B.A. (Millikin University), M.A., Ph.D. (Ohio State University). Assistant Professor of Philosophy, 1977.

BRYSON, ROSCOE E., JR., B.B.A. (Memphis State University), M.B.A., Ph.D. (Georgia State University). Assistant Professor in Accounting, 1976.

BUCHER, GEORGE CURTIS, B.S.M.E. (Washington University), M.S.M.E. (University of Alabama, University), Ph.D. (Oklahoma State University). Adjunct Professor of Industrial and Systems Engineering, 1967, 1975.

268
BUCHER, NORMAN J., B.S., M.S., Ph.D. (St. Louis University). Professor of Marketing; Chairman, Department of Business Administration; Director of Graduate Program in Administrative Science, 1973, 1975.

BURSON, ROBERT A., B.S. (Tennessee Technical University), M.D. (University of Tennessee). Adjunct Assistant Professor of Medicine, 1975, 1976.

BURTON, C. EMMORY, A.B. (Birmingham Southern College), B.D. (Garrett Theological Seminary). M.A. (Ball State University), Ph.D. (University of Tennessee). Assistant Professor of Sociology; Chairman, Sociology Department, 1976.

BUTTS, TED M., B.S. (Mississippi State University), M.A., Ph.D. (University of Alabama, University). Assistant Professor of Education; Chairman, Department of Education; Chairman, Developmental Learning Program, 1968, 1970.

CAMPBELL, P. SAMUEL, B.S. (Marietta College), M.S. (Ohio 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). Associate Professor of Mathematics, 1972, 1976.

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


CHANG, MOU-HSIUNG, B.S. (Chung-Hsing University), M.S., Ph.D. (University of Rhode Island). Assistant Professor of Mathematics, 1974.


CHUNN, RUSSELL C., B.S. (University of Alabama, University), C.P.A., C.M.A. Adjunct Instructor of Business Administration, 1977.


CLABAUGH, WEST A., B.S., M.S., M.D. (Oklahoma State University). Adjunct Associate Professor of Dermatology, 1974, 1976.

CLARK, JUNIUS M., B.S. (Texas A&M University), Ph.D. (University of Texas). Associate Professor of Biology, 1977.

COBLE, HAROLD DWAIN, B.S., (Kearney State College), M.S., Ph.D. (University of Nebraska). Associate Professor of Chemistry, 1966, 1976.

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.

COLEMAN, WILLIAM H., B.S. (Alabama College, Montevallo), M.S., Ph.D. (University of Alabama, University), M.D. (University of Alabama). Assistant Professor of Family Medicine, 1977.
COMFORT, HUGH RICHARD, A.B. (Harvard University), M.S., Ph.D. (The University of Alabama in Huntsville). Assistant Research Professor of Physics, 1977.


CONTRERAS, FRANK, B.M. (Millikin University), M.M. (East Carolina University), D.M.A. (West Virginia University), Assistant Professor of Music, 1977.

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

COPELAND, H. DONALD, B.S.N. (Medical College of Georgia), M.S.N. (Medical College of Georgia). Instructor of Nursing, 1977.


CROSSLAND, KATHRYN, B.S., M.S. (University of Alabama, University), Ed.D. (University of Florida). Professor of Nursing; Vice President for Academic Affairs, 1971.


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


DILLARD, NANCY F., B.A., M.A. (University of South Carolina), Ph.D. (University of Tennessee). Assistant Professor of English, 1972, 1974.

DOJSON, CHARLES L., B.S. (Emory and Henry College), M.S., Ph.D. (University of Tennessee). Associate Professor of Chemistry, 1966, 1968.

DONNER, EDETH, R.N. (St. Margaret's Hospital, School of Nursing), B.S.N. (The University of Alabama in Huntsville). Temporary Instructor of Nursing, 1976.


DOWD, ALAN GEORGE, M.B. (Middlesex Hospital Medical School, London). Assistant Professor of Family Medicine, 1974, 1975.


ELEY, MICHAEL H., B.A. (West Georgia College), M.S., Ph.D. (University of Georgia). Assistant Professor of Biology; Adjunct Assistant Professor of Chemistry, 1974.

EMERSON, MERLE THOMAS, B.S. (Whitworth College), M.S. (Washington State University), Ph.D. (University of Washington). Associate Professor of Chemistry, 1968.


ERMERT, MARY GAYLE, B.S.N. (McNeese State University), M.A.T. (Athens College). Assistant Professor of Nursing, 1975.

ESSENWANGER, OSKAR M., B.S. (Technical University, Danzig), Diploma in Meteorology (University of Vienna), Sc.D. (University of Wurzburg). Adjunct Professor of Environmental Science, 1971.

EVANS, ZOE A., B.S. (College of William and Mary), M.S. (University of Tennessee), Ph.D. (Medical College of Virginia). Assistant Professor of Biology, 1977.

FARACI, FRANCIS J., B.S., J.D. (University of Kentucky). Adjunct Assistant Professor of Law Enforcement, 1975.


FIGAROLA, TULIO ROMULO, B.S. (LaSalle School, Vedado, Havana, Cuba), M.S. (Ohio State University), M.D. (Havana University Medical School, Havana, Cuba). Assistant Professor of Family Medicine, 1975.

FLEMING, JAMES W., B.S., M.Ed. (Indiana University, Pennsylvania), Ph.D. (Michigan State University). Assistant Professor of Pediatrics, Adjunct Assistant Professor of Family Medicine, 1974, 1977.


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


FRANCO-BROWDER, SALVADOR, M.D. (National Medical School, National University of Mexico). Visiting Professor of Internal Medicine, 1977.

FRIERSON, WALLACE B., B.S. (Tennessee Technical University), M.D. (University of Tennessee). Adjunct Assistant Professor of Family Medicine, 1976.

FROELICH, ROBERT E., A.B., M.D. (Washington University). Professor of Psychiatry; Chairman for Psychiatry Programs, 1974.


GRANT, SILAS W., B.S., M.D. (University of Texas). Professor of Family Medicine; Associate Dean, School of Primary Medical Care, 1973.

GRAVES, BENJAMIN B., B.A. (University of Mississippi), M.B.A. (Harvard University), Ph.D. (Louisiana State University). Professor of Management; President, The University of Alabama in Huntsville, 1970.

GREEN, DAVID G., B.S., M.S.E. (The University of Alabama in Huntsville). Instructor of Electrical Engineering.


GROHSE, EDWARD W., B.Ch.E., Ch.E. (Cooper Union Institute of Technology), Ph.D. (University of Delaware). Professor of Chemical Engineering, 1960.

GRZYB, GERARD, B.A., M.A. (University of Wisconsin, Milwaukee), Ph.D. (Washington University, St. Louis). Assistant Professor of Sociology, 1977.


HARRIS, J. MILTON, B.S. (Auburn University), Ph.D. (University of Texas at Austin). Associate Professor of Chemistry, 1973.


HEAD, ROBERT R., B.S.M.E. (Auburn University), M.S.M.E. (University of Colorado), Ph.D. (University of Alabama, University). Adjunct Associate Professor of Modern Technology; Adjunct Associate Professor of Mechanical Engineering, 1959, 1976.


HELLER, HERTHA D., Perm. Teachers Certificate (Teachers College for Women, Hanover, Germany), M.A. (Vanderbilt University). Assistant Professor of German, 1965, 1969.

HENDRICKS, JOHN B., B.S. (University of Alabama, University), M.S. (Southern Methodist University), Ph.D. (Rice University). Associate Research Professor of Physics, 1973.

HENZE, REET L., B.S.N. (Gustavus Adolphus College), M.S.N. (University of Colorado). Assistant Professor of Nursing, 1975.

HINTON, BENJAMIN, B.S. (Howard College), M.D. (Medical College of Alabama). Adjunct Assistant Professor of Pediatrics, 1976.

HODGES, H. EUGENE, A.B., M.A. (University of Georgia), Ph.D. (University of Minnesota). Assistant Professor of Sociology, 1975.

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


HSIA, PEI, B.S. (National Taiwan University), M.S. (Pennsylvania State University), Ph.D. (University of Texas at Austin). Assistant Professor of Computer Science; Chairman, Computer Science Program, 1974.


HUMPHRIES, WILLIAM R., B.A.E. (Georgia Institute of Technology), M.S.E. (University of Alabama in Huntsville), Ph.D. (University of Texas). Adjunct Associate Professor of Modern Technology, 1977.

HUNG, RU J., B.S. (National Taiwan University), M.S. (University of Osaka), Ph.D. (University of Michigan). Associate Professor of Mechanical Engineering, 1972, 1976.


JAMES, ROBERT E., B.S. (Carnegie Institute of Technology), M.A. (Hollins College), Ph.D. (University of Tennessee). Assistant Professor of Psychology, 1971.

JOHANNES, JAMES D., B.S. (Arizona State University), M.S. (The University of Alabama in Huntsville), Ph.D. (Vanderbilt University). Assistant Professor of Computer Science, 1974, 1977.


JONES, KAREN E., B.S.N. (University of Illinois), M.S.N. (Emory University). Assistant Professor of Nursing, 1973.

JOOST, MICHAEL G., B.S. (Harvey Mudd College), M.S., Ph.D. (Purdue University). Assistant Professor of Industrial & Systems Engineering, 1976.

KAKANI, P. RAO, M.D. (Andhra Medical College, India). Adjunct Assistant Professor of Surgery, 1977.


KHEIR, NAIM A., B.S.E.E. (Ain-Shams University, Cairo, Egypt), Ph.D. (Hungarian Academy of Science). Associate Professor of Electrical Engineering, 1969, 1975.

KIDRON, ARYEH, M.Sc. (Hebrew University, Jerusalem), D.Sc. (Technion, IIT, Haifa). Associate Research Professor of Physics, 1974.
KILGO, REESE D., B.A. (University of Alabama, University), M.Ed. (University of Florida), Ph.D. (University of Texas). Associate Professor of Education; Adjunct Associate Professor of Sociology; 1966, 1972.


KINZER, GILBERT M., B.A. (Vanderbilt University), M.D. (University of Tennessee). Adjunct Assistant Professor of Medicine, 1976.

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

KITCHENS, JAMES M.A., Ph.D. (Louisiana State University). Adjunct Assistant Professor of History, 1975.

KOHR, DAVID B.A. (Ohio Weslyen University), M.B.A. (George Washington University). Adjunct Instructor in Community Medicine; Director of Ambulatory Care Administration and Assistant to the Dean for Administration, 1974, 1976.


LAUGHLIN, EDWARD H., B.A. (University of Virginia), M.D. (Duke University). Assistant Professor of Surgery (P/T); Chairman for Surgical Programs, 1974.

LEHNIGK, SIEGFRIED H., Ph.D. (University of Braunschweig, Germany). Adjunct Professor of Mathematics, 1976.


LEWIS, KENNETH P., B.S. (Marietta College), Ph.D. (Ohio University). Assistant Professor of Biology, 1975.

LITKENHOUS, EDWARD E., JR., B.E., M.D. (Vanderbilt University). Assistant Professor of Pathology (P/T); Chairman for Pathology Programs, 1974.


LLOYD, MARY A., B.S.N., M.Ed. (University of Florida). Associate Professor of Nursing, Chairman of Lower Division; 1972, 1977.

MAINES, ELIZABETH W., B.A. (Mt. Holyoke College), M.N. (Yale University). Assistant Professor of Nursing, 1975.

MACDOUGALL, JOHN J., B.A. (Boston College), B.S. (Georgetown School of Foreign Service), M.S. (Massachusetts State College), M.A., Ph.D. (University of Michigan). Assistant Professor of Political Science, 1975.

MARSH, EDWIN D., B.S. (University of Maryland), M.B.A. (University of Georgia). Instructor of Business Administration, 1975.

MAURER, ALICE C., B.S. (University of Alabama, University), M.S. (Florida State University). Temporary Instructor in Natural Science, 1977.

MC CALISTER, DONALD V., A.B. (Fresno State College), Ph.D. (University of Tennessee). Professor of Medical Sociology; Director of Medical Student Affairs, 1972, 1973.

MC CARRYTH, MICHAEL J., B.S. (Franklin and Marshall College), M.D. (University of Tennessee). Assistant Professor of Family Medicine, 1976.

MC CAULEY, PATRICK, B.A. (Tulane University), M.A. (Vanderbilt University). Adjunct Assistant Professor of Communications, 1974.


MC KENZIE, LUSANNE, B.A. (Murray State University), M.D. (Vanderbilt University). Adjunct Assistant Professor of Pediatrics, 1976.

MC KNIGHT, WILLIAM B., B.S. (Purdue University), Ph.D. (Oxford University). Research Professor of Physics, 1974.


MIRAKHOR, ABBAS, B.A., M.A., Ph.D. (Kansas State University). Associate Professor of Economics; Chairman, Department of Economics, 1968, 1970.

MIKELL, LA MERLE S., B.S. (Auburn University). Adjunct Assistant Professor of Interior Decoration, 1974.

MODLIN, RICHARD F., B.S., M.S. (University of Wisconsin, Milwaukee), Ph.D. (University of Connecticut). Assistant Professor of Biology, 1976.

MONTGOMERY, JOHN R., B.S. (University of Alabama, University), M.D. (Medical College of Alabama). Professor of Pediatrics and Chairman for Pediatric Programs, School of Primary Medical Care; Adjunct Professor of Immunology, School of Science and Engineering, 1975.


MOSS, CHARLES T., JR., M.D. (University of Illinois). Associate Professor of Family Medicine, Director of Family Practice Residency, 1974, 1976.

MUNSON, WILLIAM F., B.A. (Oberlin College), M.A., Ph.D. (Yale University). Associate Professor of English, 1974.

NAKAGAWA, YOSHIHARU, M.S., Ph.D. (University of Tokyo). Adjunct Professor of Mechanical Engineering, 1977.

NEIGHBORS, ROBBIE J., R.N. (Jefferson Hillman Hospital), B.S. (University of Alabama, University), M.A. (The University of Alabama in Huntsville). Instructor of Nursing and Director of the Learning Resources Center, 1976,
OLIVER, C. MICHAEL, B.S., M.S. (East Texas State University), Ed.D. (University of Southern Mississippi), Adjunct Assistant Professor of Education; Director, Division of Continuous Education, 1977.


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


PASE, MARILYN N., B.S.N. (The University of Alabama in Huntsville), M.S.N. (Vanderbilt University). Instructor of Nursing, 1975.


PEARSON, BONNIE C., R.N. (St. Joseph School of Nursing), B.S., M.N.Ed. (University of Minnesota). Assistant Professor of Nursing, 1974.

PEGDEN, CLAUDE DENNIS, B.S., M.S., Ph.D. (Purdue University). Assistant Professor of Industrial and Systems Engineering, 1975.

PENGRA, ROY W., B.A. (Grinnell College), M.A., Ph.D. (University of Wisconsin). Assistant Professor of Mathematics, 1974.

PENOT, DOMINIQUE M., B.A. (University of Aix-France), License (University of Montpellier), Ph.D. (University of Yale). Professor of Romance Languages, 1970.

PERREault, JEAN M., B.S. (Rockhurst College), M.A. (Marquette University), M.L.S. (University of Wisconsin). Assistant Professor of Bibliography, 1969.

PERRIN, MARJORIE M., B.S.N. (Medical College of Virginia), M.S.N. (University of Alabama in Birmingham). Assistant Professor of Nursing, 1973.

PETRY, FREDERICK E., B.S. (Loyola University), M.S. (Louisiana State University), Ph.D. (The Ohio State University). Assistant Professor of Computer Science, 1975.


PITTS, JANET A., B.S.N. (University of Miami), M.S.N. (Emory University), Ph.D. (University of Washington-Seattle). Associate Professor of Nursing; Dean of the School of Nursing, 1977.


PLOUSSARD, JOHN H., M.D. (St. Louis University). Adjunct Assistant Professor of Pediatrics, 1975, 1976.


RAINLEY, ROBERT LEE, B.A. (College of Wooster), Ph.D. (University of North Carolina, Chapel Hill). Assistant Professor of Political Science, 1972, 1974.

RENEGAR, PATRICK L., B.S.B.A., M.A.S. (The University of Alabama in Huntsville). Adjunct Assistant Professor of Business Administration, 1977.

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., A.B. (Kansas State Teachers College), M.A. (University of Arkansas), Ph.D. (University of New Mexico). Professor of Psychology; Dean, School of Humanities and Behavioral Sciences, 1968, 1975.

RUBIN, LINDA JEAN, B.S.N. (University of Alabama, University), M.S.N. (University of Alabama in Birmingham). Associate Professor of Nursing, 1972, 1977.

RUSH, JOHN EDWIN, JR., B.S. (Birmingham-Southern College), Ph.D. (Vanderbilt University). Associate Professor of Physics, 1967, 1969.


SARN, JOHN A., B.A. (Seton Hall University, New Jersey), M.A. (Michigan State University), Ph.D. (University of North Carolina at Chapel Hill). Assistant Professor of Art, 1976.


SCHROER, BERNARD J., B.S. (Western Michigan University), M.S. (University of Alabama, University), Ph.D. (Oklahoma State University). Adjunct Professor of Environmental Science, 1977.


SELAH, CHARLES E., B.S. (University of Oklahoma), M.D. (Tulane University). Adjunct Assistant Professor of Surgery, 1975, 1976.

SHANNON, ROBERT A., B.S. (Oklahoma State University), M.S. (University of Alabama, University), 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.S.L.M. (Alabama A&M University). Assistant Professor of Bibliography, 1971.


SIMPSON, JAMES, B.S.B.A., M.B.A. (University of Southern Mississippi). Adjunct Assistant Professor of Marketing, 1977.


SLOYER, JOHN, JR., Ph.D. (West Virginia University School of Medicine). Assistant Research Professor of Pediatrics (P/T), 1977.

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


SMITH, HERBERT T., B.S. (University of Houston), M.D. (Baylor School of Medicine). Associate Professor of Family Medicine; Chairman for Family Practice Programs, 1973, 1974.

SPARKS, JOE E., B.A. (Wake Forest College), M.Div. (Vanderbilt University), Ph.D. (University of Alabama, University). Adjunct Assistant Professor of Philosophy and Religion, 1977.

SPARKS, J. ELLIS, M.D. (Medical College of Alabama). Professor of Medicine; Chairman for Internal Medicine Programs, 1974.

STEPHENS, WILLIAM D., B.S. (Western Kentucky State University), Ph.D. (Vanderbilt University). Adjunct Associate Professor of Chemistry, 1974.

STETTLER, JOHN D., B.S. (Notre Dame), Ph.D. (Massachusetts Institute of Technology). Adjunct Professor of Physics, 1965, 1974.


STEWART, ROBERT E., B.S., M.D. (University of Tennessee). Adjunct Assistant Professor of Pediatrics, 1975, 1976.


STUHLINGER, ERNST, Ph.D. (Tubingen, Germany). Adjunct Professor of Physics, 1976.

SULLINS, WALTER R., A.B. (Stetson University), B.D. (Southern Baptist Seminary), M.A., Ph.D. (Emory University). Associate Professor of Psychology; Chairman, Department of Psychology, 1966, 1971.
SUNG, CHI-CHING, B.A. (National Taiwan University), Ph.D. (University of California, Berkeley). Associate Professor of Physics, 1972.

SUTPHIN, IONA W., B.S.N. (University of Virginia), M.S.N. (Emory University). Assistant Professor of Nursing, 1974.

TANDBERG-HANSSEN, EINAR A., Cand., Mag., Cand., Real., Doctor Philosophiae (Oslo). Adjunct Professor of Physics, 1976.

TARTER, DONALD E., B.S. (Middle Tennessee State College), Ph.D. (University of Tennessee). Associate Professor of Sociology, 1966, 1969.

THOMPSON, KENNETH O., B.S., B.A.E., B.B.A., M.S. (University of Minnesota), Ph.D. (University of Alabama, University). Associate Professor of Engineering; Director of Institutional and Research Support Services, 1969.


TRAYLOR, JOSETTE A., A.B. (University of Missouri), M.A. (Middlebury College). Assistant Professor of French; Chairman, Department of Modern Foreign Languages, 1965, 1969.


VAN DURMEN, ALICE C., B.A. (Florida State University), M.A. (Stetson University), Ph.D. (University of South Florida). Assistant Professor of English, 1976, 1977.


WALKER, WALTER Y., B.A. (Vanderbilt University), M.D. (Medical College of Alabama). Adjunct Assistant Professor of Surgery, 1976.


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.


WHARRY, RHODA E., B.S.E. (University of Arkansas), M.S. (Memphis State University), Ph.D. (Purdue University). Professor of Education, 1967.

WHITE, CAROLYN W., A.B. (University of North Carolina at Greensboro), M.A., Ph.D. (Duke University). Associate Professor of Political Science; Chairman, Department of Political Science, 1967, 1977.


Lecturers

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ADAMS, CURTIS L. V., B.S. (University of Alabama, University), M.D. (Medical College of Alabama). Lecturer in Psychiatry, 1976.


AYERS, ORVAL E., B.A. (Berea College), M.S. (Auburn University), Ph.D. (University of Alabama, University). Lecturer in Chemistry, 1974.


BLACK, ROBERT O., B.S. (University of Oklahoma), M.S.E. (The University of Alabama in Huntsville), M.S. (Massachusetts Institute of Technology). Lecturer in Modern Administration, 1976.


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

BOYLES, LARRY F., B.S. (Jacksonville State University), Graduate, School for Bank Administration. Lecturer in Accounting, 1977.


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


CRAWFORD, CLARENCE M., B.S.B.A. (University of Alabama, University), M.A.S. (The University of Alabama in Huntsville). Lecturer in Accounting, 1977.

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

DANIEL, CHARLES C., B.S.I.E. (University of Alabama, University), M.S. (The University of Alabama in Huntsville), Ph.D. (Oklahoma State University). Lecturer in Administrative Science, 1975.

DAVIS, BERVIL, B.S.E.E. (University of Alabama, University), M.P.A., Ph.D. (University of Oklahoma). Lecturer in Administrative Science, 1976.


281


ENGLER, ERICH E., B.S. (Berlin, Germany), M.S. (University of Alabama, University). Lecturer in Fluid & Thermal Engineering, 1971.


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


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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.

GREGG, KAREN, B.A. (East Tennessee State University), M.S. (University of Tennessee). Lecturer in Computer Science, 1976.


GUINN, GERALD R., B.M.E. (Auburn University), M.S.M.E. (Purdue University), Ph.D. (University of Alabama, University). Lecturer in Engineering, 1967.


282


HARPER, CHARLES DUDLEY, B.S. (McNeese State College, Louisiana), M.S. (The University of Alabama in Huntsville). Lecturer in Physics, 1977.


HAYS, R. DUANE, B.S.E.E. (University of Missouri at Rolla), M.S.E., Ph.D. Candidate (The University of Alabama in Huntsville). Lecturer in Modern Technology, 1971.


HINTZE, GEOFFREY C., B.S., M.S. (Virginia Polytechnic Institute and State University), M.S. (Stanford University). Lecturer in Computer Science, 1977.


HOLL, HERBERT B., Ph.D. (University of Jena, Germany). Lecturer of Physics, 1976.


HOOPER, JAMES W., B.S. (Florence State College), M.S. Math (Auburn University), M.S. Computer Science (University of Missouri). Lecturer in Computer Science, 1974.


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283
JOHNSON, LLOYD A., B.S. (Florence State University), M.A.S. (The University of Alabama in Huntsville). Lecturer in Modern Administration, 1974.


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LOWE, DAVID H., B.M. (Hardin-Simmons University), M.M. (University of Texas). Lecturer in Music, 1974.


284
MAC ILVEEN, KYRA, B.A. (Whitman College), Diplome (University of Aix, Marseille, France). M.Ed. (University of Oregon). Lecturer in Russian, 1975.

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MC DANIEL, DON M., B.S. (Ohio State University), M.S., Ph.D. (The University of Alabama in Huntsville). Lecturer in Industrial and Systems Engineering, 1975.


MILBERGER, JOE F., B.A. Arch. (University of Texas), A.I.A. Lecturer in Interior Decoration, 1975.

MILLER, JAMES R., III, B.S. (Western Kentucky State College), M.S. (University of Alabama, University). Lecturer in Physics, 1977.

MILLER, LINA, B.A. (Bob Jones University), M.M. (Louisiana State University), 1977.


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O'REILLY, GEORGE T., B.S. (Michigan State University), M.S.E. (The University of Alabama in Huntsville), Ph.D. (Vanderbilt University). Lecturer in Electrical Engineering, 1975.


PASCHALL, JO ANNE, B.S.A. (Memphis State University), M.F.A. (University of Georgia in Athens). Lecturer in Art, 1975.

285
PASTRICK, HAROLD L., B.S.E.E. (Carnegie Institute of Technology), M.S. (Stanford University), Ph.D. (California Western University). Lecturer in Mechanical Engineering, 1967.

PAUL, DARYL D., JR., B.S., M.S.E. (The University of Alabama in Huntsville). Lecturer in Computer Science, 1974.


POLLARD, JAMES D., B.A. (University of Richmond), M.A. (Purdue University). Lecturer in Communications, 1974.


RIEGER, GISELA S., B.A. (The University of Alabama in Huntsville). Lecturer in German, 1977.


SCALEs, JEANNE D., B.A. (Millsaps College), LL.B. (Jackson School of Law). Lecturer in Modern Administration, 1973.


Smith, C. Lynwood, Jr., B.A. (University of Alabama, University), M.A. (Rutgers University), J.D. (University of Alabama, University). Lecturer in Political Science, 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, University). Lecturer in Mechanical Engineering, 1974.


Tjaden, Jeanne, B.M., M.M. (Drake University), 1977.


287


WERKHEISER, ARTHUR H., JR., B.S. (Lafayette College), M.S., Ph.D. (University of Tennessee). Lecturer in Physics, 1969.


WILLIGE, LARRY, Instructor in Health, Physical Education and Recreation, 1974.


WORLEY, MARVIN L., B.S. (University of Georgia), M.S. (University of Alabama, University). Lecturer in Modern Administration, 1975.


Clinical Faculty
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BAKER, GRADY L., M.D. (Louisville). Family Practice/General Practice.

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Index

Academic Advisement and Information Center ........................................... 43
Academic Honor Societies ........................................................................... 34
Academic Information .................................................................................. 43
Academic Loads ......................................................................................... 46
Accreditation ............................................................................................. 2
ACT Program ............................................................................................. 18, 20
Administration .......................................................................................... 5, 6
Administrative Science, Graduate Program in ........................................... 65
  Specialized Options ................................................................................... 67
Admissions Information (Undergraduate) .................................................. 7
  Academically Talented High School Students ........................................... 8
  Admission to the Freshman Class ............................................................. 7
  Application Procedure ............................................................................. 8
  Audit Student ........................................................................................... 11
  Foreign Student ....................................................................................... 11
  High School Student ............................................................................... 8
  Irregular Post Graduate ......................................................................... 10
  Medical Programs ................................................................................... 12
  Non-Matriculated Student ....................................................................... 13
  Readmission ............................................................................................ 12
  Special Student (Modified Open Admission) .......................................... 8
  Transfer Students ................................................................................... 9
  Transient Students ................................................................................. 10
Admissions Information (Graduate) ........................................................... 12, 245
Area of Concentration (AOC) .................................................................... 59
  When to Declare ..................................................................................... 60
Art .............................................................................................................. 68
Athletics (Intercollegiate) .......................................................................... 40
Athletics (Intramural) ................................................................................. 41
Audio-Visual Service ................................................................................. 6
Behavioral Sciences, School of Humanities and ........................................ 64
  Bibliography ......................................................................................... 233
Biology ....................................................................................................... 155
Board of Trustees ...................................................................................... 266
Business Administration Program ............................................................. 78
  Accounting Option .................................................................................. 79
  Finance Option ....................................................................................... 80
  Management Option .............................................................................. 80
  Marketing Option ................................................................................... 80
Calendar ................................................................................................... ii

292
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